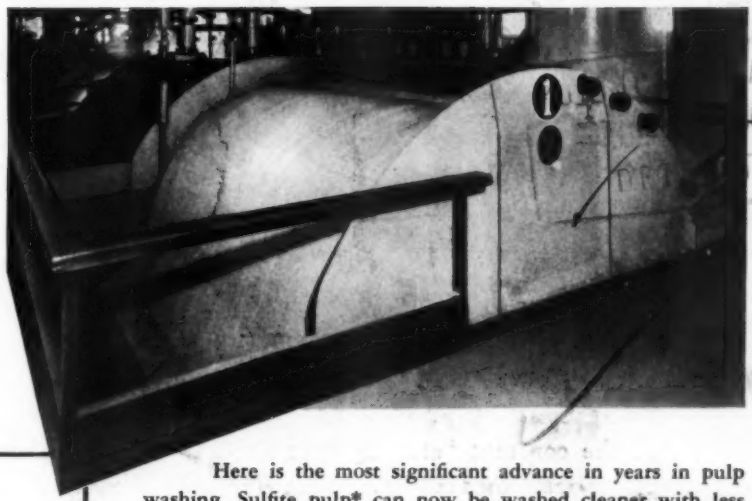
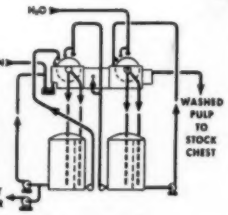
AUGUST 1950

The Paper Industry

TECHNOLOGY DEPT.

Cleaner Sulfite Pulp with Less Wash Water





FLOW SHEET OF A TYPICAL 2-DRUM 4-STAGE WASHER

Swenson-Nyman Pulp Washers actually cost less installed, because each drum provides two washing stages. This reduces the number of drums required, as well as the amount of auxiliary equipment.

Here is the most significant advance in years in pulp washing. Sulfite pulp* can now be washed cleaner with less water, on Swenson-Nyman Pulp Washers. Each drum provides 2-stage washing, and the entire system is totally closed.

Using two drums with a repulper between (flow sheet shows resulting 4-stage operation) the sulfite stock emerges cleaner, while the recovered liquor carries a higher percentage of total solids to evaporators, alcohol plant or other recovery process.

Send for Bulletin E-108 which fully describes this and other Swenson equipment for pulp mills.

*Also soda and sulfate pulp

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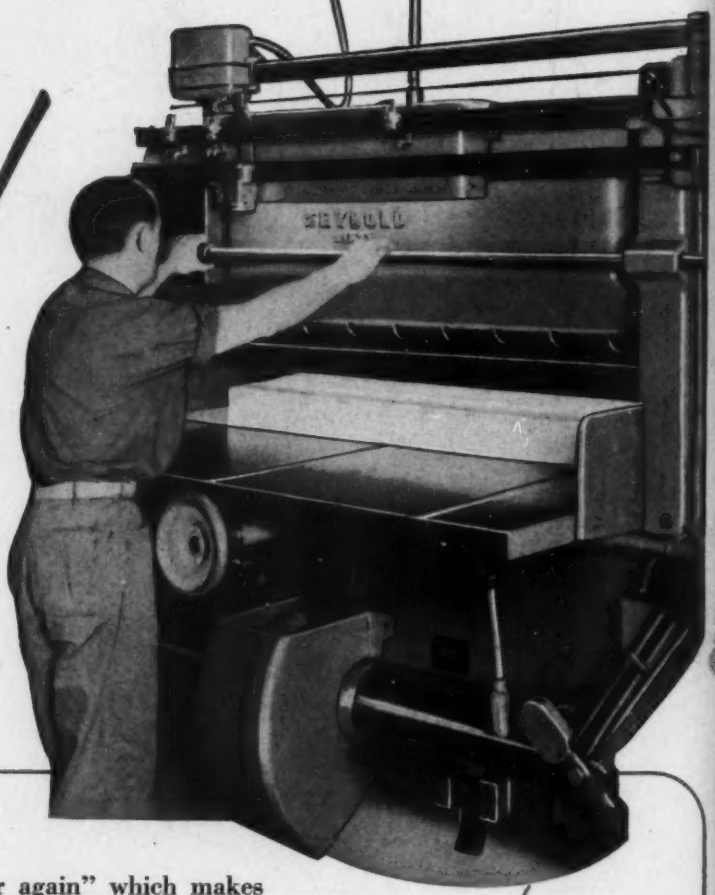
ON YOUR MARK... *Once* GET SET... *Once*

GO!

TILL THE JOB IS DONE!



It's the constant "starting over again" which makes cutting operations costly . . . the tedious job of positioning the paper for one cut after another.

SEYBOLD has mechanized this tedious job—makes the cutter do the work, not the operator. Once set, the SPACER-TRIMMER starts its routine of cuts automatically, quickly, accurately. No combinations of settings too complicated or too numerous for this machine. Dozens of settings can be carried; each one precise and positive.

Hours of time, tons of spoiled sheets are saved by this SPACER-TRIMMER . . . the lowest cost equipment in your plant. Over its average life, it costs a dollar a day. Ask your SEYBOLD representative for details.

*All Seybold Mill Trimmers have

Z-ACTION

—the exclusive method of putting the knife through the pile.

HARRIS-SEYBOLD

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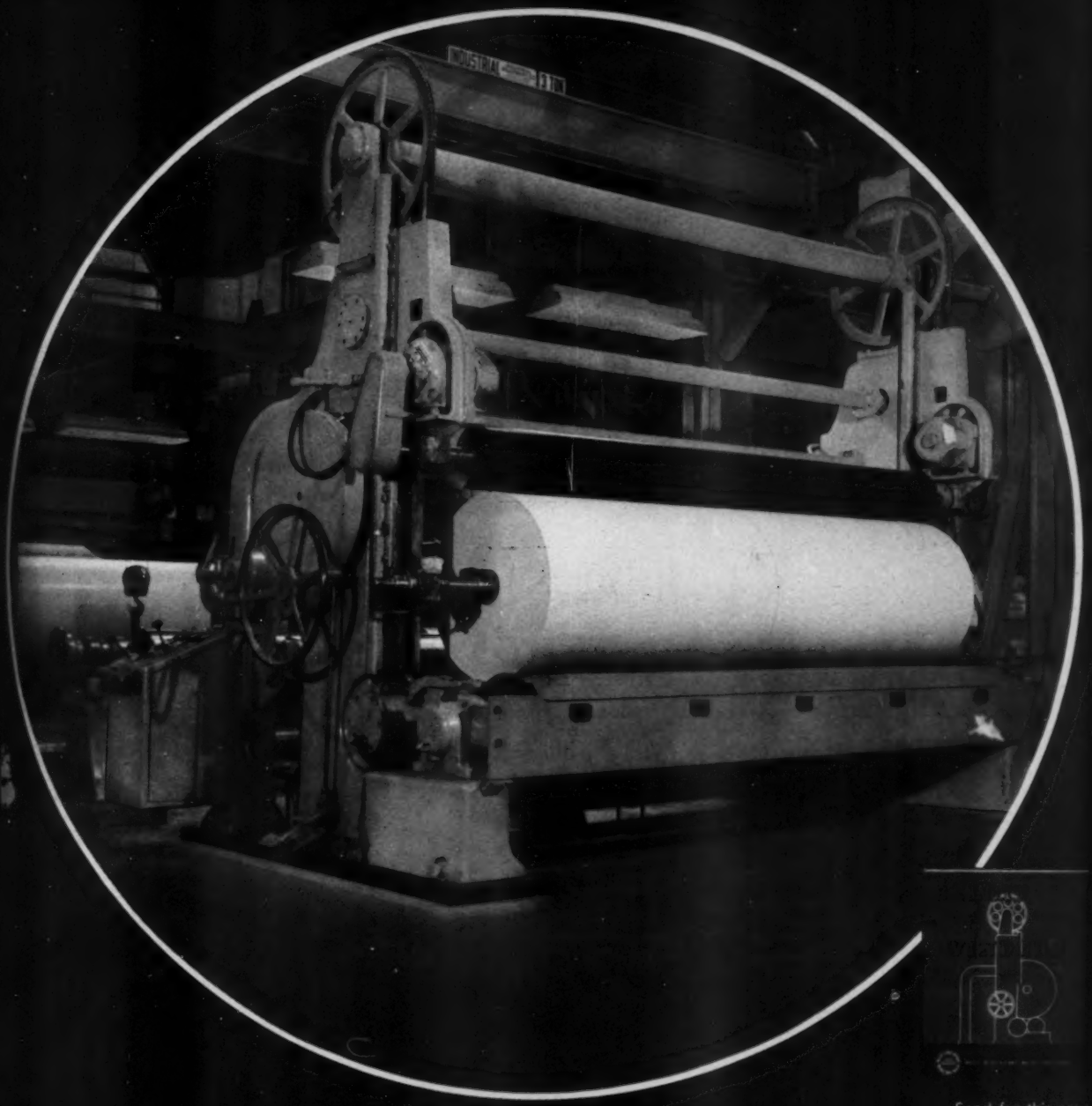

Send for this new
Illustrated Story of Beloit
High-Speed Winders

Rugged, fast, well balanced, dependable

Sturdy, rigid, hard iron frames and drums of Beloit High-Speed Winders are cast and machined by precision experts. Winder shown above is on a tissue machine and has motor-driven rider roll and variable-speed separate motor drum drive to secure desired shipping roll hardness. Other notable advantages are provided by the patented counterbalance application mechanism and the air-operated unwind stand brake permitting complete control of sheet tension from the operator's panel.—*Beloit Iron Works, Beloit, Wisconsin.*

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PAPER MACHINERY

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 32 • NUMBER 5 • AUGUST, 1950

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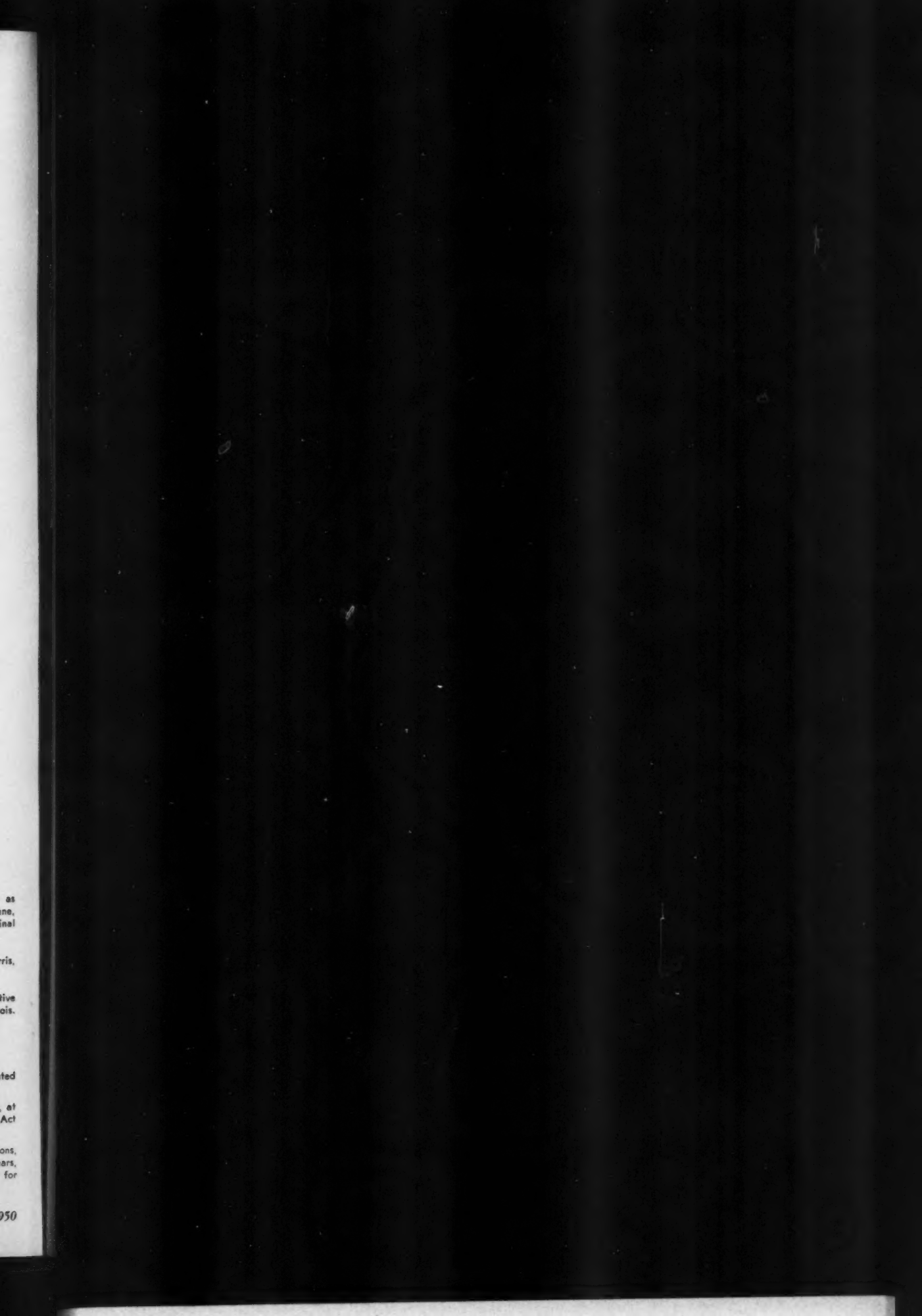
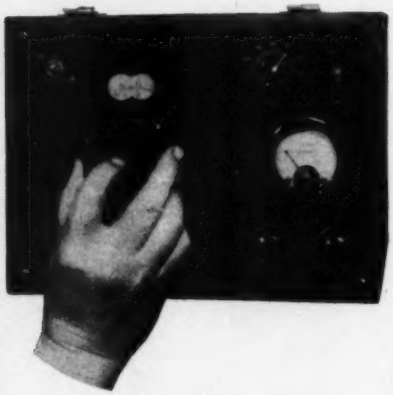


pH . . . *always under control!*



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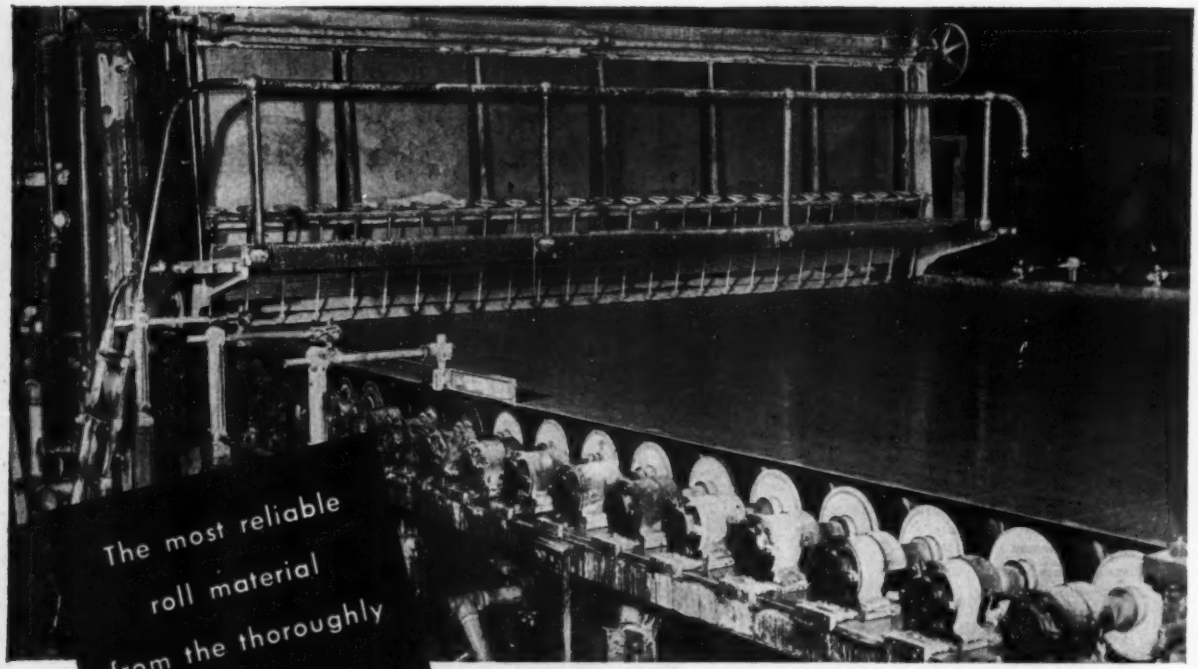


View of Fourdrinier section of 218-inch No. 6 Bagley & Sewall paper machine equipped with ANACONDA Brass Rolls. Built for the St. Regis Paper Company.

WHEN you specify BRASS for table rolls, guide rolls, tension rolls and felt rolls your production is positively protected by the inherent resistance to corrosion characteristic of the alloys of copper.

When you specify ANACONDA Red Brass, you get rolls from a source which has supplied the paper industry for years.

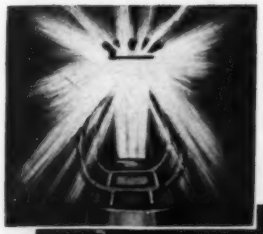
The brass alloy will be right. The metal will be sound. The roll surface will be excellent. Your special tolerances in size, roundness and straightness will be met with precision.

And, as you know, too, brass will not pick up stock. ANACONDA Brass Rolls stay clean.

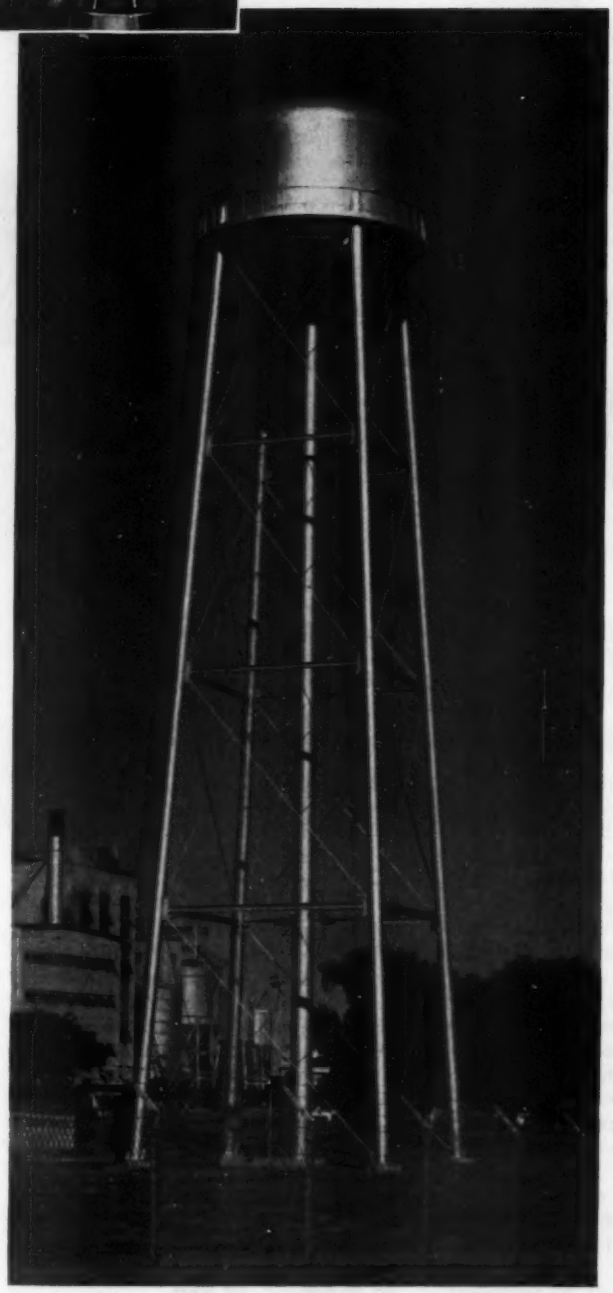
The American Brass Company offers its experience with technical requirements of copper alloys for paper mill equipment. To draw upon it, just write to the Technical Department, The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

S-3-3

For dependable paper production...use ANACONDA® BRASS ROLLS



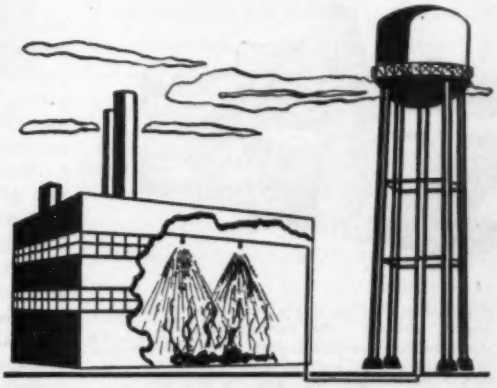
A lifetime of plant fire protection ...paid for in FIVE years



Throughout the years of its operation, the new pulp mill and paper plant of Fibreboard Products, Inc., at East Antioch, California, is certain to have water available for fire protection. Why? Because the primary supply for the plant's automatic sprinklers is stored in the 100,000-gal. Horton elevated tank shown at the left. The supply is assured because the water in the tank is held for fire protection purposes only. Since the water is stored *above* the plant, it flows by unfailing gravity pressure.

And what does this "lifetime" protection cost? Fibreboard's investment is self-liquidating . . . the Horton tank will pay for itself out of reduced fire insurance premiums in just *five short years.*

You protect lives and property—and save insurance dollars—when you make a Horton elevated tank an integral part of your automatic fire fighting system. Tanks like the one illustrated are built in standard capacities from 15,000 to 500,000 gallons. Write our nearest office for information on a "lifetime" water reserve for your fire protection system. When requesting quotations on elevated tanks, state capacity, height to bottom, location and type of insurance you carry.



Diagrammatic illustration of an automatic sprinkler system supplied by an elevated water tank. The instant a fire starts, water—under gravity pressure—sprays from the first sprinkler head that opens. The fire is usually confined to a small area because the flames are quenched before they have a chance to gain headway.

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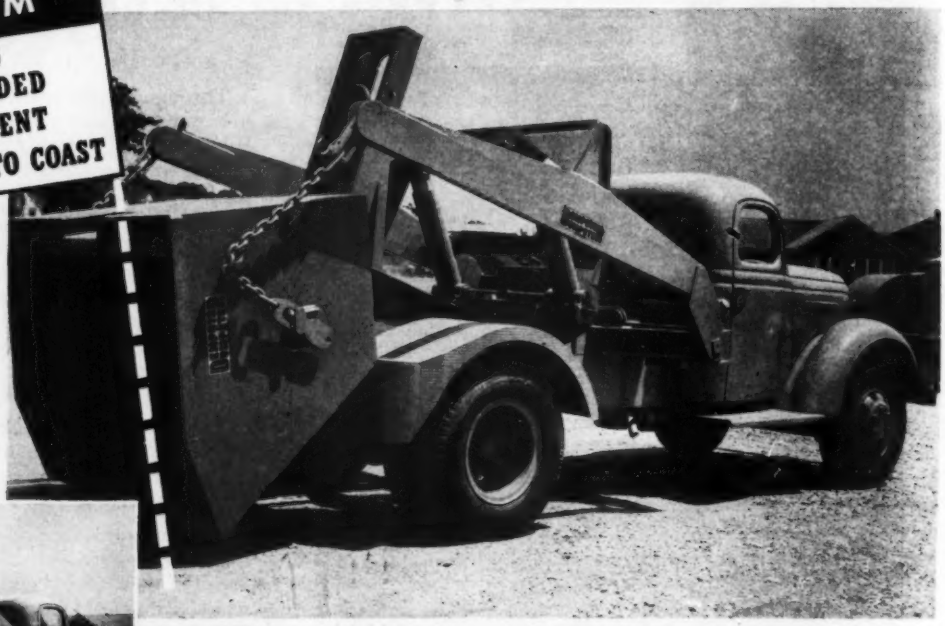
SYSTEM

SERVING COST-MINDED MANAGEMENT FROM COAST TO COAST

. . . handling bulk materials of every description at phenomenal savings



Photos show the three simple stages of servicing a container. The Dempster-Dumpster, operated from hydraulic controls by driver in the cab, picks up each container and hauls it to point of disposition where it may be dumped or set down intact.

★ WVPPCO – *recognized across the nation*

. . . West Virginia Pulp and Paper Co., well known for sound management, uses the Dempster-Dumpster System

West Virginia Pulp and Paper Co. is among the hundreds of cost minded manufacturers, both large and small, using the Dempster-Dumpster System of bulk materials handling . . . the system recognized across the nation for its efficiency and ability to reduce costs.

Instead of operating several conventional trucks one truck alone can service any number of detachable containers, ranging up to 12 cu. yds. payload with the Dempster-Dumpster System. With this modern system of bulk materials handling, truck never stands idle to be loaded. One truck mounted Dempster-Dumpster, with only one man, the driver, is kept busy picking-up, hauling and dumping one pre-loaded container after another. Containers are spotted inside and outside your plant. They are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish.

The Dempster-Dumpster System cuts man-hours . . . reduces truck investment, gas, oil, maintenance costs . . . improves "housekeeping" methods . . . reduces fire hazards . . . provides an easier, quicker, safer and more efficient manner of handling materials. It will pay you to investigate the Dempster-Dumpster System now! A product of Dempster Brothers, Inc.

One Dempster-Dumpster Services All Containers. . . All Designs. . . All Sizes

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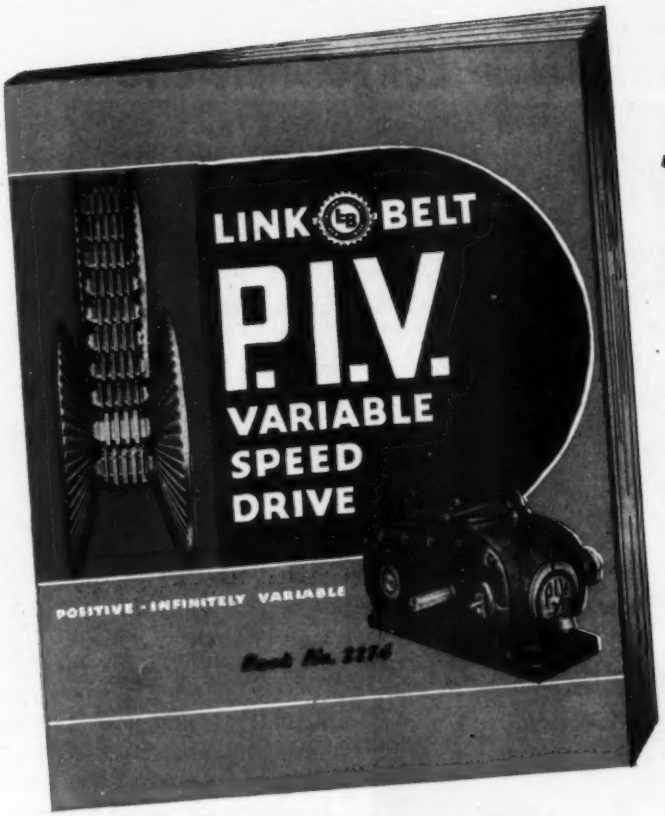

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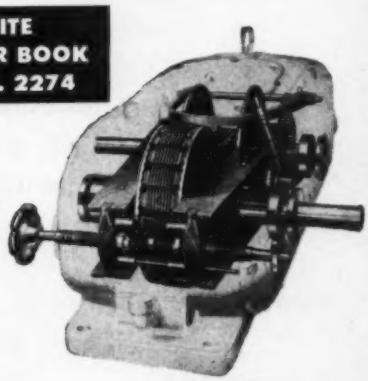

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1/2 TO 25 H. P.

Available in standard form for vertical or horizontal mounting and with extra input and output gears, also with motor integrally mounted. Ratios up to 6:1.

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Wherever speed is a factor in manufacturing operations or processes, the supremacy of the Link-Belt P.I.V. variable speed drive becomes readily apparent, as a means of providing precise control, instantly variable, and reliably constant over long periods. Power is transmitted from input to output shaft through a *unique chain* which makes *positive* engagement with radial grooves on two pairs of opposed driving wheels. Movement of the control screw simultaneously varies the effective diameters of these wheels. Thus an infinite number of *stepless* speed adjustments is possible between maximum and minimum settings. Because it is entirely independent of frictional elements, the P.I.V. variable speed drive *eliminates slip or creep*, ends costly guess work or hunting and extends the range of operations for greater efficiency and higher production.

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AUTOMATIC CONTROLS

Link-Belt "Job Engineered" Automatic Controls provide instant, accurate adjustment of output speed, by electrical, hydraulic, pneumatic or mechanical accessory devices. WRITE FOR BOOK 2349.

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For dependable operation at efficient speed without slip; for positive, infinitely variable control of rotary motion; for rapid speed changing by manual, automatic or remote control, INDUSTRY USES

ST.381

LINK-BELT
P.I.V. Variable Speed Drive

Efficient water removal means:

Longer Felt Life
Less Down-Time
Increased Production
Greater Profits

In one mill after another, Downingtown Suction Press Rolls have proved that vertical water removal pays off in longer felt life, less down-time, and higher machine speeds. Plain press rolls extract the water horizontally, forcing it back through the web of paper and the felt, against the direction of the run. This disturbs the formation, and tends to fill up the felt. Mill data show clearly the advantages of the suction method.

For example, before a recent installation on a Harper-type Fourdrinier, the top speed on 12-13 lb. napkin stock was 450 FPM, because crushing and pin holes developed at the press when this speed was exceeded. A 22-inch rubber-covered Downingtown Suction Press Roll permitted operation at 700 FPM, and gave a 90% increase in felt life. No other changes or additions were made to the machine. Forming and drying capacities limited the speed to 700 FPM—not press capacity.

Efficient vertical water removal shown by absence of water at incoming side of press

In another mill that is producing facial, a Downingtown Suction Roll allowed a speed increase from 700 to 1200 FPM. Again press was not the limiting factor. Prior to the installation, felts had to be washed three times each 24 hours. Felt life average was seven days. Since installation, no washing of felts during runs is required, and felts now average 16 days, a life increase of well over 100%, at an increase of 70% in speed.

These are not exceptional cases, but are exactly the kind of results you can expect in your mill. We'd like to tell you more about Downingtown Suction Press Rolls and the rest of our complete line of suction equipment. Write us.

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DOWNINGTOWN, PA.

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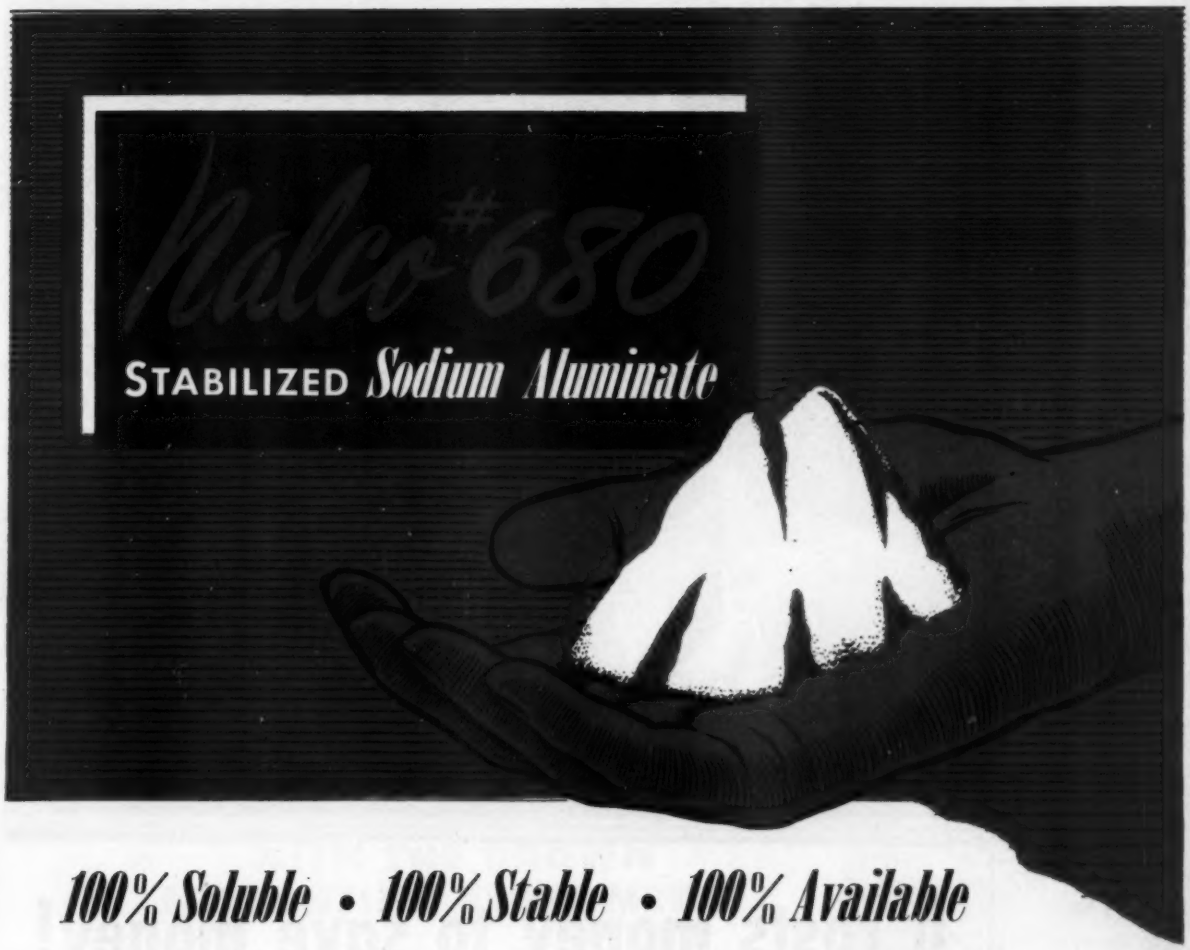
DESIGNERS AND BUILDERS OF PAPER AND BOARD MAKING MACHINERY SINCE 1880



100% Soluble • 100% Stable • 100% Available

NALCO 680 is *completely* soluble, *completely* stable . . . the one sodium aluminate that remains in solution as sodium aluminate and does not settle out.

Every ounce of Nalco 680 provides active alkaline alumina . . . always available for rapid reaction. That means reduced alum requirements, lower acidity, better sizing, better retention, and therefore, better products.

Read the results reported at right — then ask a Nalco Representative to show you how Nalco 680 can repeat them in your mill.

BOX BOARD MILL — Power Savings

"Machine tenders report much better sheet formation with Nalco 680, and that jordans can be cut back 10 amps. Machines are cleaner with no deposits on cylinders."

KRAFT MILL — Alumina Retention

"Improvement in sizing, better retention of alumina, and general texture of the sheet using Nalco 680 are very marked. Converter reports the sheet handles better."

SULFITE BOND MILL — 45% Less Alum

"Results using Nalco 680 at the rate of 5 pounds per ton have been good. Improved sizing and reduced alum so that 140 pounds of alum is being added per 4500 pounds of furnish, instead of the previous 250 pounds of alum. This enabled the mill to meet rigid pH specifications for the paper."

TISSUE MILL — Clean Machines

"No. 6 paper machine remaining clean and generally good results through the use of Nalco 680 applied at the rate of four pounds per ton into the fan pump suction."

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Nalco

Serving the Paper Industry through Practical Applied Science

It costs money to save money!

President: McPherson, our records show that you have used more felts this year than last year. How come?

Superintendent: The Sales Department ordered better quality and finer finish. And that, sir, is an order that calls for more and better felts.

President: Then how do you account for the fact that our production costs per ton haven't gone up?

Superintendent: I switched over to Hamilton Felts for every press. They removed so much more water that they saved time at the driers. Time costs money.

President: Felts cost money, too.

Superintendent: Yes. But Hamilton Felts also *save* money because they last longer, run faster, increase production, and give the sheets finer finish—few ends and practically no broke.

President: Trust a Scotchman to squeeze every penny's worth of service out of every felt.

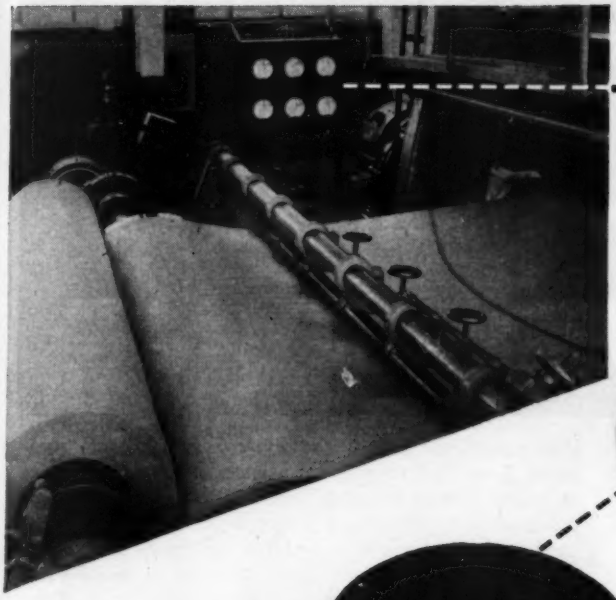
Superintendent: And trust a Hamilton Felt to squeeze the high costs out of every ton of paper or board.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

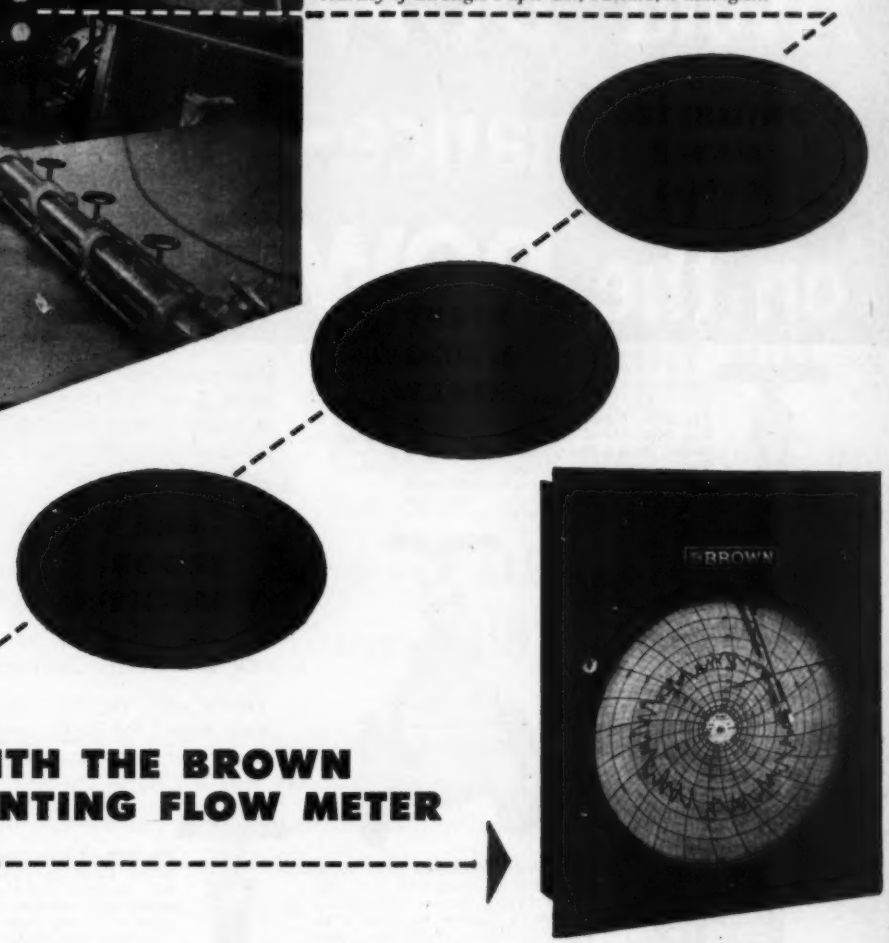
• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •



Recording, integrating flow meters in machine room measuring main steam flow... as well as steam to paper machine, felt dryer and mill heating system. Photo courtesy of St. Regis Paper Co., Tacoma, Washington.



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YOUR costs for generating and utilizing steam (or other fluids) are known facts when you install a Brown Accounting Flow Meter. Hourly and daily records tell exactly what you must know to avoid uneconomical operation.

Flexibility of installation makes Brown Electric Flow Meters a "natural" for centralized panels . . . while mechanical flow meters are ideal when conditions require recording adjacent to the point of measurement. Both types feature interchangeability of range tubes, eliminating the necessity for changing orifice plates when maximum flow rates are changed.

These advantages—plus low maintenance—have made Brown Flow Accounting increasingly popular in paper mills. There they produce sensational economies which quickly pay for their installation and enable them to show a continual profit.

Now is the time to investigate the increased mill efficiency possible through the application of such an accounting system to your processes. Call in your local Honeywell engineer . . . he is as near as your phone!

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FOR THE PAPER INDUSTRY

Honeywell
BROWN INSTRUMENTS

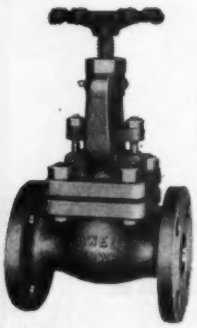
Avoid "DOWN-TIME" for Maintenance—Standardize on the POWELL LINE

150-pound Screwed End Gate Valve with outside screw rising stem and yoke, bolted flanged bonnet. **Fig. 2470** (18-8S, 18-8S Mo, Durimet "20"). **Fig. 2472** (Monel Metal, Nickel, Hastelloy Alloys A-B-C, Ampco Alloy, Everdur). These valves are also available with flanged ends, with face-to-face dimension conforming to MSS SP42.

When you buy a valve, ask yourself these two questions. First, will it operate satisfactorily in the service in which it is to be used? Second, and of most importance, how much *maintenance* will it require? Because, every time maintenance becomes necessary, there's a two-fold cost. One, the cost of labor—and possibly parts—to put it back in working order. Two, the loss of production farther down the line.

And, because Powell Engineers *always* have this in mind, every valve in the *complete* Powell Line* is designed and made to avoid, as far as possible, "DOWN-TIME" for maintenance.

That's why, through the years, Powell Valves have been noted for long, trouble-free performance—even under the most exacting service conditions.



150-pound Flanged End Globe Valve, Outside screw rising stem and yoke, bolted flanged bonnet. Face-to-face dimensions conform to MSS SP42. **Fig. 2475** (18-8S, 18-8S Mo, Durimet "20"). **Fig. 2477** (Monel Metal, Nickel, Ampco Alloy, Hastelloy Alloys A-B-C, Everdur). These valves are also available with screwed ends.

Fig. 2608—A new 200-pound Bronze Globe Throttling Valve. Scientifically designed and proportioned to permit FULL FLOW through seat when wide open, greatly minimizing turbulence and pressure drop. Has special bronze stem and stainless steel disc and seat hardened to approximately 500 Brinell.

Fig. 3003— Class 300-pound Cast Steel Gate Valve. Flanged ends, outside screw rising stem, bolted flanged yoke, tapered solid wedge.

Fig. 1893—Flanged end Gate Valve designed and developed especially for Paper Mill service. Body, bonnet and yoke are cast of 3% Nickel Iron; screwed-in seat rings are 18-8 SMo; solid wedge is made of Ni-resist.

* **The Complete Powell Line includes Globe, Angle, "Y", Gate, Check, Non-return, Relief and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-resistant metals and alloys.**

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AND EQUIPMENT COMPANY

The illustration above shows P.P.&E. high pressure, high temperature piping being tested by means of a Reflectoscope which produces pulses of vibration waves of a frequency above hearing and transmits them at an angle into the metal through a searching unit which contains a sensitive quartz crystal.

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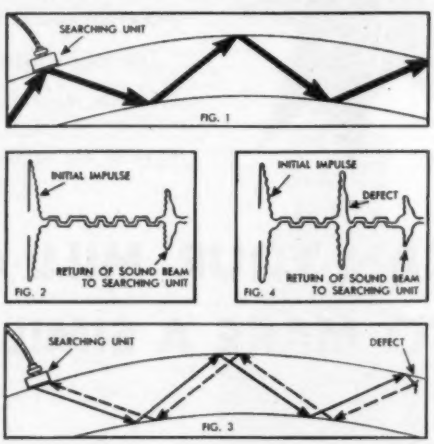
How the *"Ultrasonic"* Eye Works



Intermittent ultrasonic vibrations are transmitted angularly into the section under inspection, so that each sound beam is reflected away from its point of origin progressively from inner to outer pipe wall surface in a consistent pattern, as shown in Fig. 1, until it circles the pipe and returns to the searching unit. The uninterrupted flow and return of the beam is indicated on the oscilloscope screen as diagrammed in Fig. 2. Any discontinuity in the metal lying in the path of the sound beam will interrupt transmission as shown in Fig. 3, reflect the sound back to the searching unit, and provide a visual indication of its presence and location on the oscilloscope screen (see Fig. 4).

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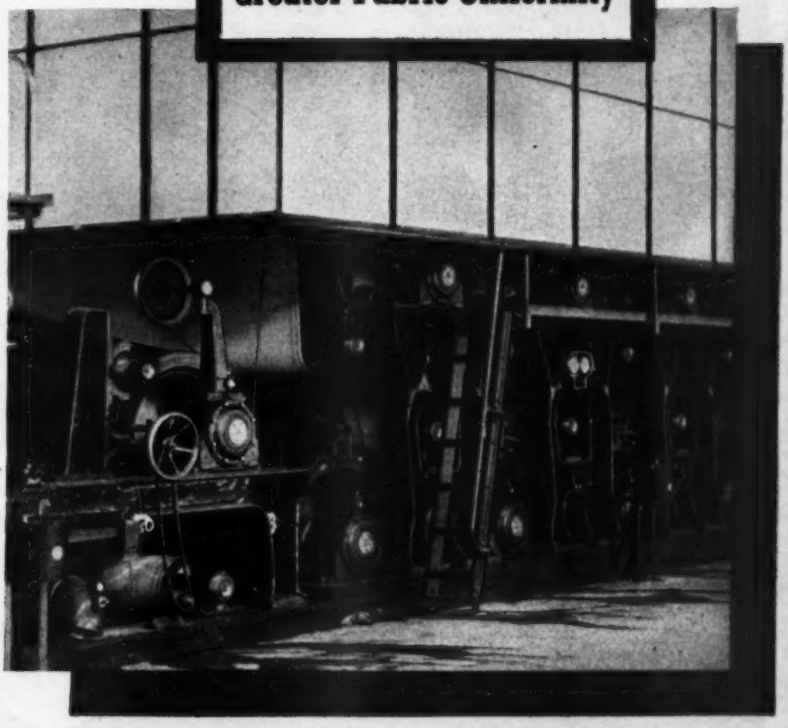

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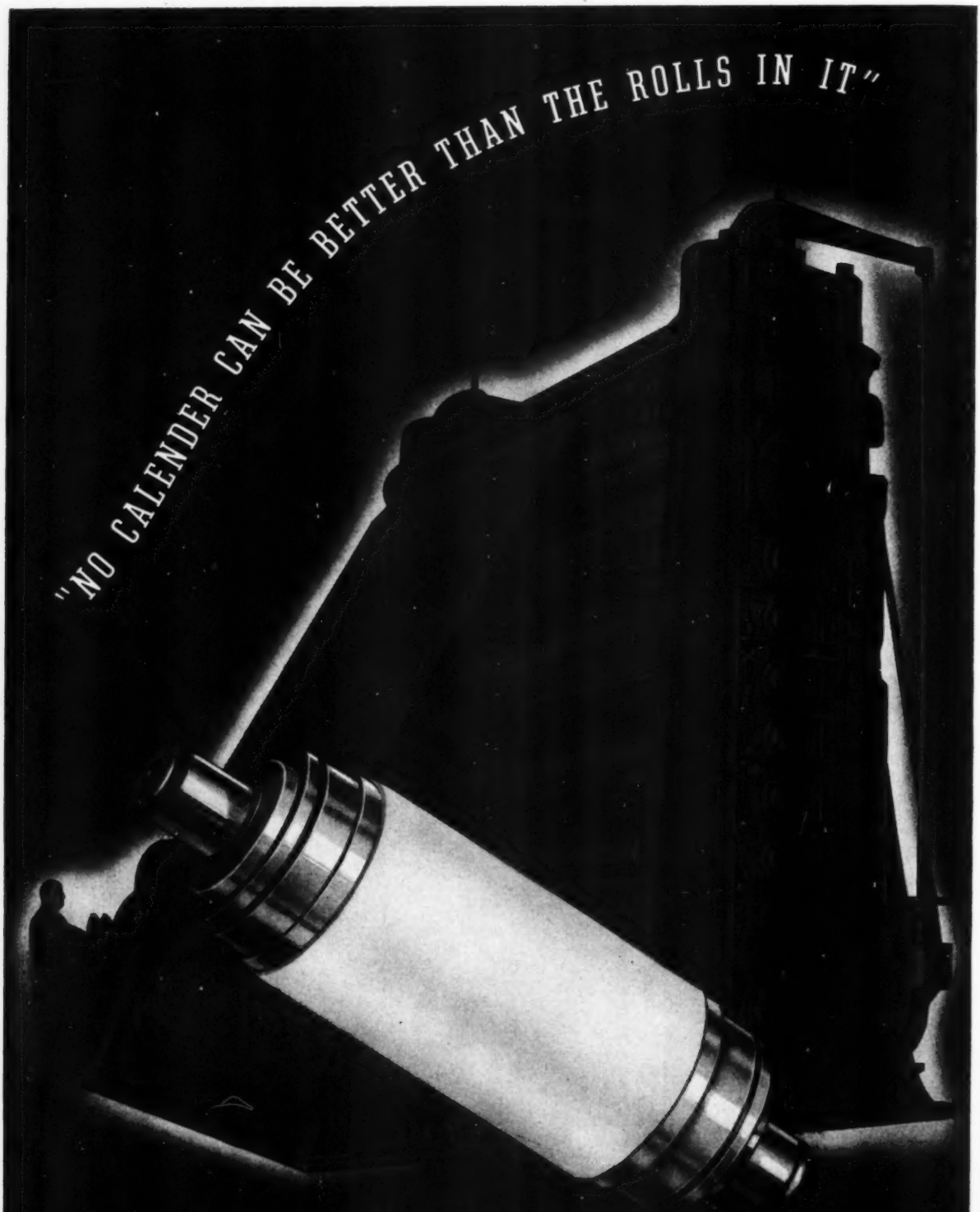

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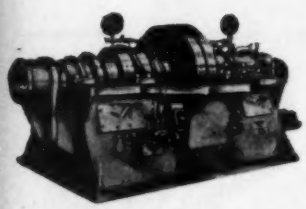
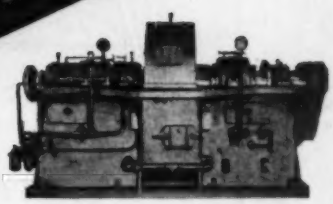


34 Inch, front, with cover removed

NEW disc design



48 Inch, front view

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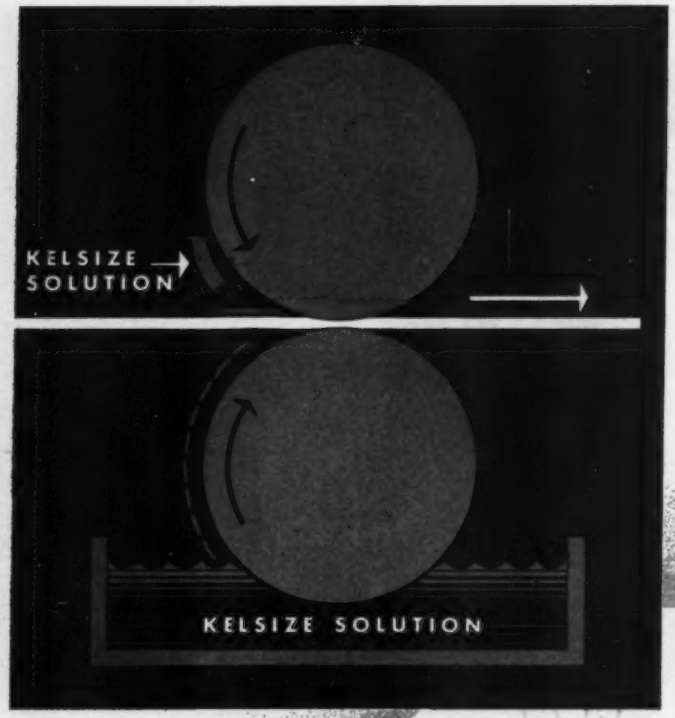

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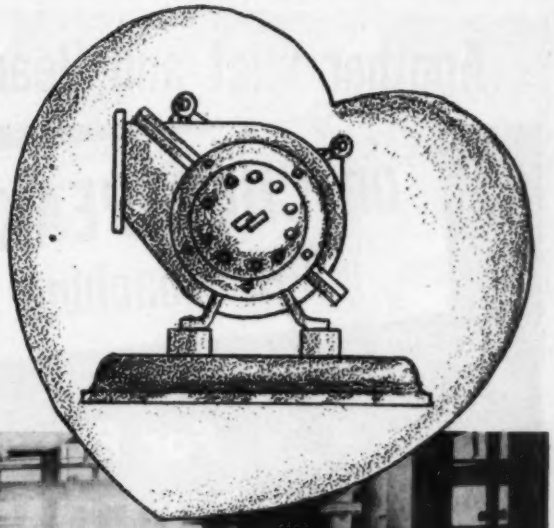
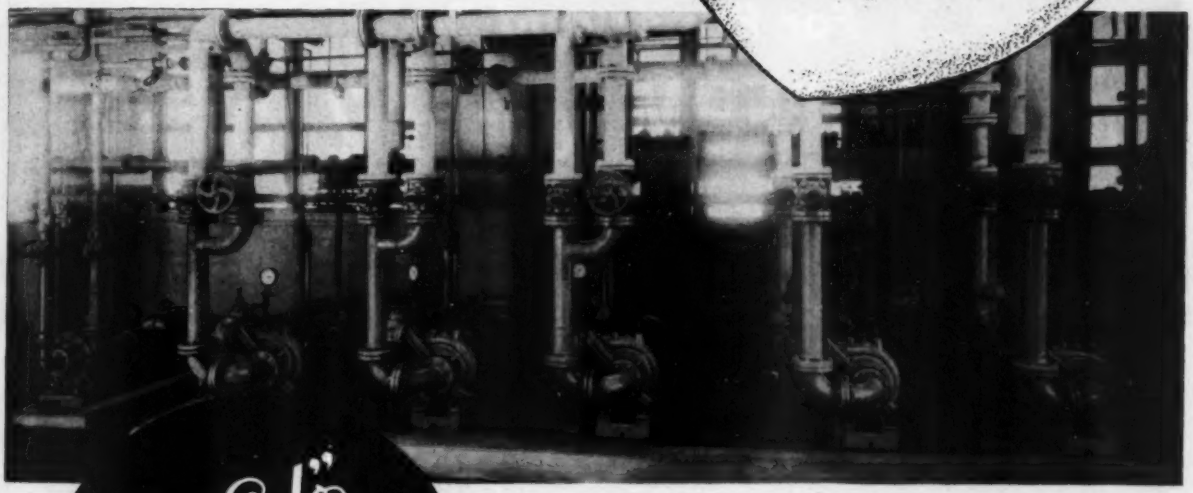
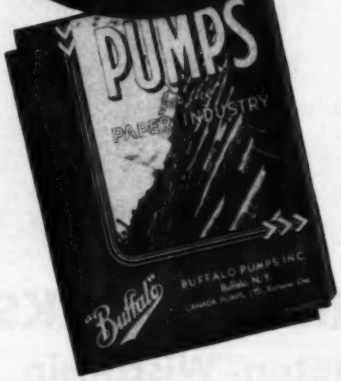
When the Pump is the "HEART" of the Process-





"Buffalo" PAPER STOCK PUMPS



-Avoid Expensive Timeouts!

Like the human "pump," many paper stock pumps are in effect the "heart" of important processes. A timeout for the pump is expensive, any way you look at it.

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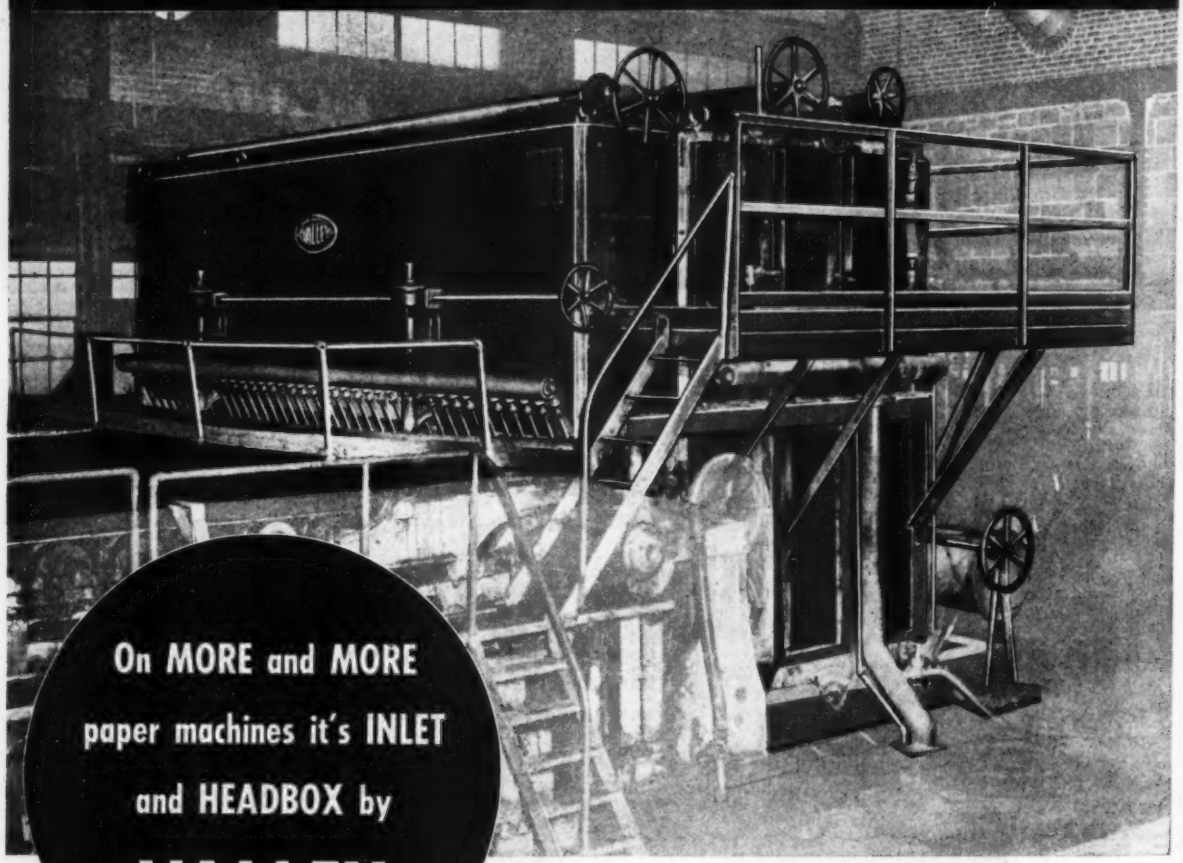

On MORE and MORE paper machines it's INLET and HEADBOX by **VALLEY**

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In plants handling corrosive liquids, or fluids that must be kept free from contamination or discoloration, Stainless Steel Valves must be not only the right *type*, but fabricated of the *proper* alloy for the service.

To keep production at peak, and down-time for repairs and replacements to a minimum, alert management chooses Jenkins Stainless Steel Valves. Built to the same quality standard which has made "Jenkins" the preferred industrial valve, Jenkins Stainless Steel Valves are available in a range of sizes to meet almost any service requirement.

Equally important, however, is Jenkins Engineering Service. Providing information you need to select the alloy or type of valve which will render the best service (based on analysis of specific information about the valve installation), Jenkins engineers can be of valuable assistance.

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VALVES
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HERE IT IS!

Fig. 3639-3678 Self-Priming Centrifugal

Goulds NEW Self-Priming Pump

Only GOULDS gives you all five of these outstanding advantages

1. Absolutely no valves of any kind in pump—nor are any needed in installation. Liquid can drain out of discharge and suction line through pump without affecting priming ability.
2. No recirculation of liquid after completion of priming action.
3. Efficiencies comparable to quality straight centrifugal pumps are thus obtained.
4. Positive fast-acting self-priming similar to priming ability of positive displacement pumps.
5. No large or bulky priming chambers or reservoirs, providing a compact unit at low cost.

APPLICATIONS:

Any service where suction lifts are encountered. Particularly adaptable for automatic service or where liquids to be pumped contain air or gas. Pump will automatically free itself of air and positively will not vapor lock.

Open impeller type. Sump service • Sewage effluent • Marine-bilge pumping, etc. • Mine gathering and dewatering • Dewatering excavations, cellars, etc.

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SIZES—CAPACITIES AND OTHER FEATURES

39 Models and Sizes

¼ to 5 H.P. ratings

Open and enclosed impellers

Capacities to 120 G.P.M.

Heads to 135 ft. depending on capacities

Suction lifts to 25 ft.

Also available in Flexible coupling motor drive or belt drive and close-cupld gasoline engine-driven unit.

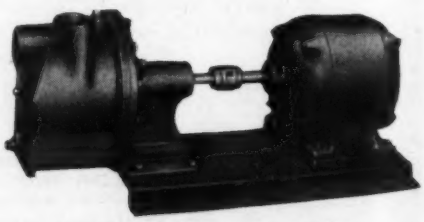

Fig. 3739-3789 Flexible coupling type drive

Patents Pending

FOR FULL DETAILS WRITE FOR BULLETIN 636.1

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T-Head rivets fit into head locks cast on link . . . prevent turning and confine wear to wider bearing area inside barrels.
Closed joints protect chain against dirt.
Large lubricant chamber cored in barrels.
Front face of barrel acts as scraper . . . material does not pack in trough. Rear face of barrel shaped for smooth operation over sprockets.
Vertical lugs reinforce side bars . . . protect rivet ends.
Wide wearing shoes take the abrasive sliding wear . . . add extra chain life.

With Rex H-Type Conveyor Chains, you get the cost-cutting advantage of large capacity and even loading at low speed. Their great width permits them to handle bigger loads at lower speeds, thus reducing the abrasive wear on the chains and assuring long, economical service.

The outer barrel faces are designed to act as scrapers, and avoid any tendency to ride over material in the trough. You get efficient materials movement without the need or expense of scraper flights mounted on chain.

Rex H-Type Conveyor Chain links are one-piece castings ruggedly designed for long life. Their many outstanding advantages as shown in the illustration above assure most economical operation for years. They are available in both high quality Rex Malleable Iron and, where even longer service life is desired, in Rex Z-Metal.

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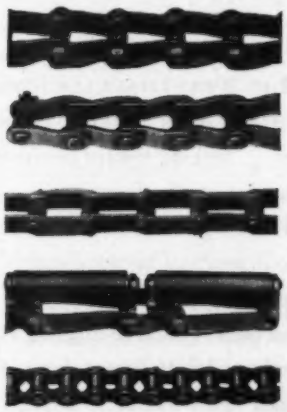
CHAIN BELT COMPANY *of Milwaukee*

OTHER REX QUALITY LUMBER MILL CHAINS



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☐ I would like to see a Rex Field Sales Engineer

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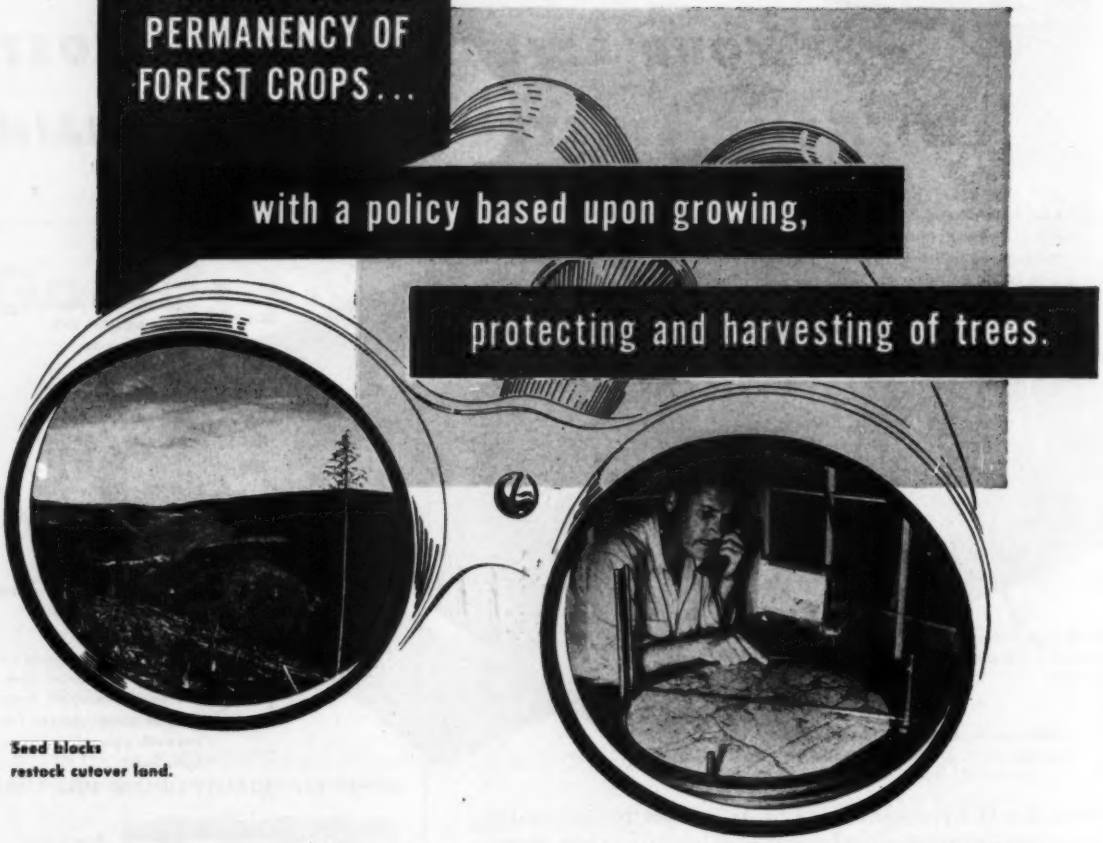
LOOKING TOWARD PERMANENCY OF FOREST CROPS...

with a policy based upon growing,

protecting and harvesting of trees.

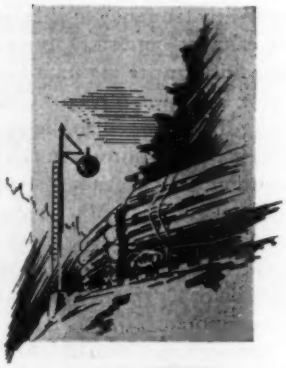


Seed blocks restock cutover land.

Spotter plotting a fire location.

THE WEYERHAEUSER forestry policy is based upon the *planned* growing, protecting and harvesting of trees . . . looking toward permanency and more complete utilization of the forest crop.

The Pulp Division, Weyerhaeuser Timber Company, derives much of its wood supply from pre-logging which takes out small trees that may be damaged in falling large ones . . . and re-logging which utilizes the left-over chunks and slabs. Using these advanced "harvesting techniques" plus hydraulic barking of logs, Weyerhaeuser mills are utilizing the forest crops more completely than ever before, insuring the reliability of the Pulp Division as a continuing source of supply.



PULP DIVISION

WEYERHAEUSER

The Paper Industry

August 1950

"Lest We Forget"

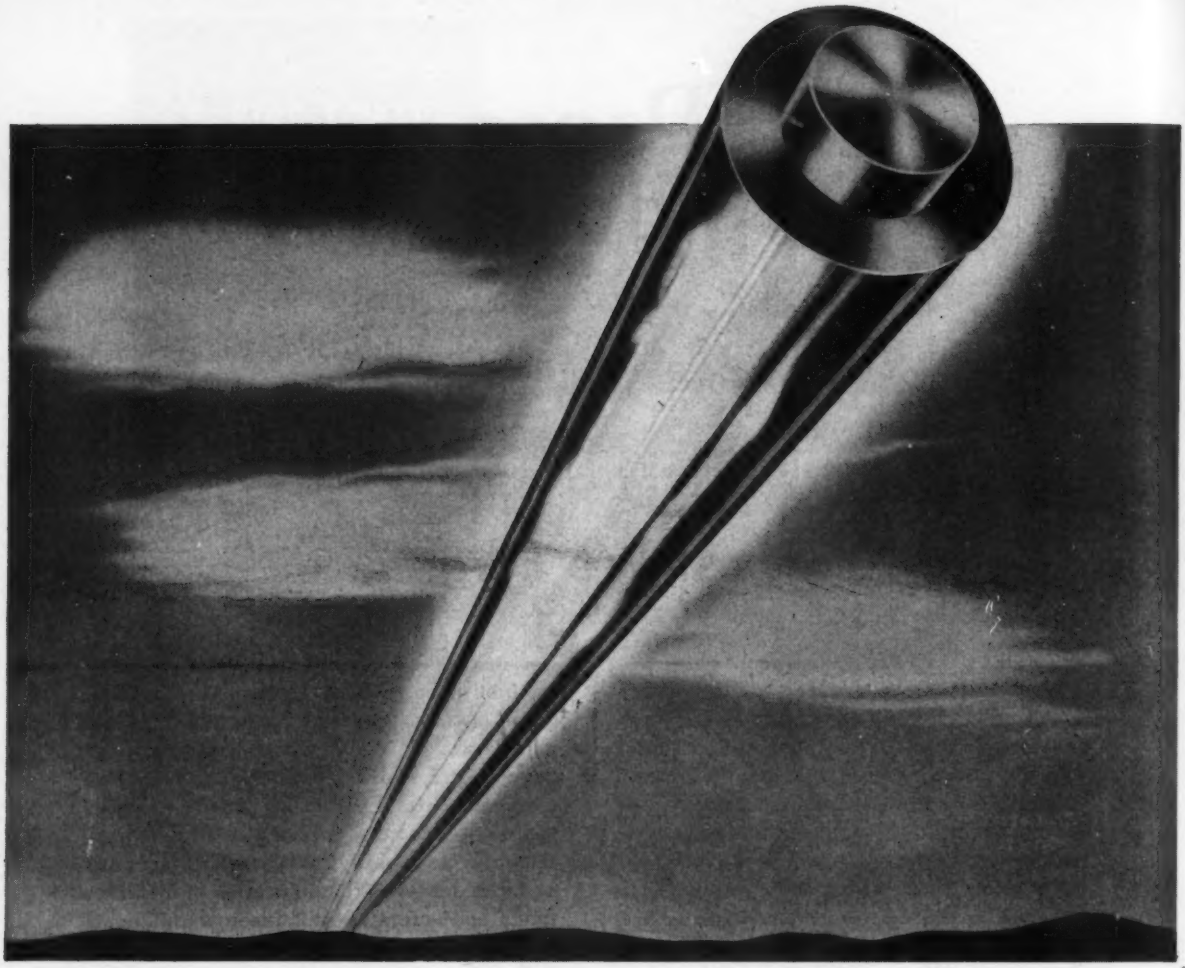
THE FIGHTING IN KOREA has been under way several weeks. Whether we call it an "incident," police action, or out-and-out war, we now realize that our fumbling tactics of the cold war are no longer adequate in a world where power politics are predominant. We have indulged in the wishful thinking that no nation would dare risk a war with us. Consequently, our preparations for meeting such a situation have been pretty inadequate. Regardless of the outcome in Korea, it is clear that we must face up to the realities of an ever-threatening "hot war." We can no longer sidestep world responsibilities, and we are committed to the point where neutrality even in its broader sense is virtually impossible.

One of the first steps in organizing for war is to divert production from consumer goods to military equipment and supplies. Even while this re-direction of production is just getting started, its effect on our economy appears to follow the familiar pattern of the early years of previous wars. Already the rush to build inventories is on. Overbuying of potentially scarce materials by manufacturers as well as individuals is already undermining the efforts being made for an orderly conversion toward a partial wartime economy. While the protection afforded by substantial inventories in times like these is desirable, excessive or speculative buying only tends to increase the need for controls. In fact, no matter what happens in Korea, there seems to be little question that controls and allocations of one kind or another will be imposed in the near future.

In the event of strict allocation of critical war materials, the mills themselves will feel the first pinch. While we pointed out in these pages last month the fact that the pulp and paper industry is in better shape than at the beginning of World War II, the use of critical maintenance and operating supplies such as spare parts, motors, pumps, fourdrinier wires, felts, etc., is not easily curtailed. The fact must be faced, however, that allocation of metals to tanks and airplanes will mean a tightening supply of our own operating materials.

It isn't hard to remember when individual paper mills ordered fourdrinier wires, for example, under the guise of needing them to keep the mill going when in reality they were building inventories. Then, when the supply became plentiful, purchase contracts were cancelled to reduce inventory. Such irregular and unnecessary purchasing practices naturally imposed undue hardship on suppliers. On the one hand, it was necessary to employ expensive overtime labor to keep up with mill orders. Then, when mill inventories were reduced and purchases curtailed, manufacturing plants lay idle. It isn't difficult to understand the futility and waste involved in this kind of scare buying.

Operation in a war economy isn't easy. But we only have to look back a few years to see how we did it before. It is heartening to recall that there weren't many mills shut down due to lack of operating and maintenance materials. Actually, few real scarcities should develop for some time even though mobilization plans are increasing in tempo. Panicky buying is no substitute for good business judgment, especially in times like these.



A Gleaming, Polished Roll TWO MILLION INCHES LONG

That's what a composite of Vickery Doctored rolls* would add up to—
and that gives you some idea of the importance good papermakers attach to

VICKERY DOCTORS
ENGINEERED FOR EVERY ROLL

*Press rolls, breast rolls, wire rolls, dryers, calender and super-calender rolls.

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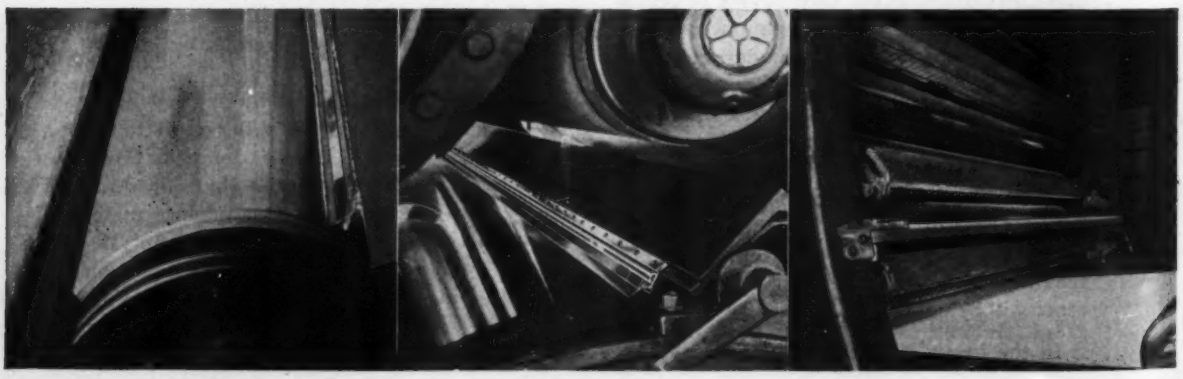

Present conflict summarized

AT A MOMENT WHEN the hot war in Korea has the world in a whirl, he would be foolish indeed who would attempt to forecast the future of business for even a few hours in advance. It has become increasingly evident from the day when the Communists of North Korea invaded the South Korean Republic that Administration officials at Washington from the top down are in such a confused state that the left hand does not know what the right hand is doing. Perhaps, in view of the allegations of Communist infiltration into officialdom it might be more appropriate to say that the right hand does not know what the left hand is doing.

Only one thing seems certain and that is that this country is now determined to do no more appeasing and that any further aggression anywhere by Red nations will be met more promptly than we met the second Pearl Harbor in Korea.

The sequence is clear and cannot be disputed. The State Department, whether by infusion of Communist sympathizers or by lack of foresight, had definitely written off China and Korea, as well as possibly Formosa, as areas where we would not dispute Red aggression. With the invasion of South Korea, the President immediately reversed the previous State Department policy—such as it was, if any, as to the Orient—and ordered immediate support of the South Korean Republic.

From that moment on there has been no turning from this purpose, the only vacillation being in determining the extent and means of further defense of free nations everywhere. Denials and contradictory statements on various rumors as to the extent of the nation's mobilization have flowed constantly from official sources at Washington, with almost hourly changes of policy developments.

The certainty is that more and more troops will be sent to Korea until the United States, acting as the agent of the United Nations, restores peace in that area, and that there will be sufficient mobilization of the regular, National Guard and Reserve military forces to meet a repetition of the Korean Red orgy in any other part of the globe. That means a certain extent of industrial mobilization, some controls over production and distribution, but as yet no additional tax levies. Plans to drop the proposed elimination of nuisance excise taxes have gone by the board, but limitation of profits through new excess profits taxes, and increased income taxes seem certain to follow.

All of this survey might be changed over night by developments in Korea or elsewhere, but the record of events to the present is incontestable.

At the moment the President has merely asked stand-by authority to impose controls on steel and other heavy industries indispensable to the war effort. For the moment, control over paper, by allocation procedure, is still in the distance as is also rationing of foods or goods for civilian consumption. Any prolonged military campaigns in Korea or particularly elsewhere, would seem to assure such controls eventually.

Paper industry at peak

Meanwhile the paper industry is experiencing the greatest boom in its history. Production of paper and paperboard in the first half of 1950 has reached an all-time high, a rate of over 23,000,000 tons per year. Prices have moved up, and pulp supplies are tight, with no more in sight from abroad for the balance of the year except for the filling of existing contracts. Deliveries are far behind, averaging from six to eight weeks in practically all grades. Despite unprecedented demand, there has been no profiteering by the mills and price advances have been calculated more to curtail speculative or inventory demand than to earn a quick dollar.

The demand is such that it has been stated openly in metropolitan newspapers that paper manufacturers in many cases are arbitrarily allocating their product to establish customers, with deliveries rationed in accordance with production schedules and available output. One such newspaper statement was that some mills will establish allocation systems to be imposed on dealers and distributors if demand continues to bypass production capacity.

This development resulted in a public announcement by Congressman Celler, chairman of the Congressional Subcommittee investigating possible monopolistic trends in major industries, that such allocation systems, if arranged by collusion among the mills, are violative of the antitrust laws.

"I call upon the Department of Justice and the Federal Trade Commission to watch these developments very carefully," Congressman Celler warned.

Newsprint investigation

Congressman Celler's committee investigation of newsprint has been productive of little which will serve to ease the present shortage, admittedly due to excessive demand and not to lack of normal production. Testimony before his committee has shown that present output is higher than at any time in history. A blunt statement was made before the Committee by J. D. Zellerbach, President of the Crown Zellerbach Paper Corporation, when he testified that the price situation is the key to any rise in capacity.

"I think prices eventually will be increased," he said, "I don't think the price of newsprint is too low on an established investment, but it is too low to attract the risk capital necessary to bring new capacity to the industry."

Testimony before Mr. Celler's committee has been voluminous, but seems to have produced nothing to demonstrate that there has been any concerted price fixing of newsprint prices. Mr. Celler has been piqued by the refusal of Canadian producing companies to

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This machine embodies every desirable feature that experienced users have requested. It is the nearest approach yet to the ideal electric 1000-lb. fork-lift truck.

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make their records available to his committee, and is likely to ask an amendment to the antitrust laws to compel companies whose sales are chiefly in the United States market to maintain records in this country where they would be available to Governmental agencies. It is admitted that price-fixing of newsprint, if any, has been developed in Canada, in accordance with Canadian law, and not in this country where our own antitrust laws might be violated.

A possible development of the newsprint investigation is the possibility that Mr. Celler's committee will not confine its investigations to newsprint, but may conduct a widespread investigation of the entire paper and paperboard industry in this country.

A blanket investigation of pricing practices in the domestic paper industry has been determined upon by the Federal Trade Commission. Practically every divisional group in the American Paper and Pulp Association has been listed for investigation, including the kraft, newsprint, groundwood, sulphite and other groups, approximately a dozen in all. The proposed scope of the investigation would take Commission agents into the records of these associations for about fifteen years back and unless the fifteen year proposed range of the investigation is limited, there is certain to be a bitter court battle before the associations will submit to the suggested probe of their activities.

THE DOMESTIC PAPER INDUSTRY has been prompt to offer its co-operation to the national authorities in meeting the Korean crisis. In World War II it took months for the War Production Board to recognize that paper is indispensable to the war effort. Washington has learned from that experience, and is already in contact with the industry in preliminary efforts to ascertain the best methods for achieving 100 per cent collaboration. Conferences already have been held with the representatives of the various divisions of the industry by a representative of the Department of Defense. Contact has been established with the Munitions Board and the National Resources Board as a basis for official co-ordination of the various branches of the paper industry with the national agencies concerned with production of essential commodities.

Groups still on watch over basing point and water resources control

Although the President vetoed the legislation proposed to end the muddle over the basing point or delivered price

situation, the Senate Finance Committee has set up a five-man "watch dog" sub-committee to keep an eye on the situation looking toward a renewed effort at the next session of Congress to formulate some method under which industry can know its legal rights in meeting competition. The difficulty for industry has been and still is the fact that there is no established standard of what may be done legally, and industry only knows that any pricing policy may be attacked. What is more needed than anything else in the price setting field is a definite statement of legal procedures, as against the present policy of the authorities in telling industry to go ahead and if you go wrong you will be punished.

Meetings are scheduled in various parts of the country to secure local opinion on the proposals for controls of the nation's water resources. The paper industry's attitude has been given the Water Resources Policy Commission at three meetings so far held. One for the Lake States was held at Columbus, Ohio, July 24; another for New York and New England, at Springfield, Mass., July 25; and one for the Southeastern States at Atlanta, Ga., July 31. The basic investigation is preliminary to proposals being presented at Washington to establish TVA controls over watersheds in all parts of the country. The paper industry has taken the position that waterpower is vitally necessary to the operation of its mills and that no move should be undertaken which would impair its production facilities.

PILOT PLANT EXPERIMENTS made by the National Council for Stream Improvement have indicated that from 30 to 60 per cent of the oxygen demand (depending on initial strength), almost all color and other undesirable features of combined kraft mill waste can be removed by a lime-recarbonation process. Pilot plant tests revealed a lack of adequate control methods and operating techniques required to make the lime-recarbonation process a success, so a small continuously-operating unit is being employed to attempt solution of the remaining problems.

TWENTY-THREE PULP and paper mills have with their annual corporation reports for 1949 qualified for the "Highest Merit Award" citation awarded by *Financial World*, and are eligible for the "Best of Industry" award which will be presented at the Financial Award Annual Report Banquet this fall. A year ago the 1948 annual report of Champion Paper and Fibre Co., Hamilton, Ohio, won the trophy for the best report in this classification.

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The rugged design and construction of Fawick Airflex Clutches provide long trouble-free operation under heavy-duty service.

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Financial

▶▶▶ THE KOREAN WAR CAUSED a series of sharp drops in securities prices with paper mill issues sharing in the decline. Most of the advances of the past year were canceled out, but with the clarification of national policies by Washington pronouncements the prices were relatively stabilized. While paper securities are not in the class of war babies, the heavy present demand for all grades, and the certainty of heavy Government purchases of many grades, particularly in the packing field, stocks of the major companies did not sustain the severe drop felt by many specialty industrial issues.

Brown Co.—Net income for twenty-eight weeks ended June 15 was $1,618,000 as compared with $1,092,000 for the comparable period a year ago.

Champion Paper and Fibre Co.—Net income for the fiscal year ended March 31 was $8,765,917 as compared with $9,997,282 for eleven months ended March 31, 1949.

Crown Zellerbach Corp.—Net income for the fiscal year ended April 30 was $18,956,373 as compared with $21,179,080 for the previous fiscal year.

Masonite Corp.—Net income for nine months ended May 31 was $4,794,200 as compared with $2,752,042 for the comparable period a year ago.

Mead Corp.—Net income for twelve weeks ended June 11 was $1,333,007 as compared with $404,467 for the comparable period a year ago.

St. Regis Paper Co.—Earnings for six months ended June 30 were $4,212,281 as compared with $3,302,888 for the same period in 1949.

Paper Mill Corporate Changes

St. Regis Paper Co.—St. Regis has sold its Norfolk, N.Y., mill to interests headed by Harry Pearlman, president of National Paper Corp. of Pennsylvania, manufacturers of sanitary papers. Production of the Norfolk mill will be transferred by St. Regis to other mills of that company.

Claremont Paper Corp.—The Claremont Paper Corp. of Claremont, N.H., has been sold to the Bemis Bag Co., which will take at least a part of the old mill's output of kraft papers.

Franklin Paper Co.—After over eighty years of operation the Franklin Paper Co. has ceased operations at its Holyoke, Mass., plant and will be sold, if possible. If a sale is not negotiated the company will be liquidated. Increased production costs forced this step.

Stillwater Tissue Mills, Inc.—If court approval is secured, the Stillwater Tissue Mills will be sold to Stevens & Thompson of Greenwich, N.Y. The mill has been closed since January.

Hudson Pulp & Paper Co.—All outstanding 3½ per cent Sinking Fund Debentures due July 1, 1966, have been called in for redemption at 102 per cent of the principal amount on August 21, 1950, plus accrued interest to that date.

New York Stock Exchange—Stocks

Closing Prices

	July 20	June 20
A.P.W. Products	4	4
Celotex	14¼	13
Same Preferred	16	• 16½-16⅝
Certain-teed Products	12⅝	16⅝
Champion P. & F. Co.	34⅝	36⅞
Same Preferred	105	103½
Chesapeake Corp.	• 28¾-29¼	29½
Continental Diamond	8⅝	• 8⅝-9
Container Corp.	45¼	47¾
Same Preferred	*105-106	*105-106
Crown Zellerbach	35	34⅛
Same Preferred	104¼	104½
Same $4 Preferred	*104½-106	107¼
Dixie Vortex	• 37½-39	43
Same "A"	54	52⅜
Eastern Corp.	14¼	14½
Robert Gair	8¼	8¼
Same Preferred	• 17⅜-17½	• 18⅜-18½
Gaylord Container	18	18⅛
International Paper	43¾	46½
Same Preferred	*104¼-106	*1 -108¾
Kimberly-Clark	34½	36¾
Same Preferred	*137-140	148
McAndrews & Forbes	37	• 40¼-41
Marathon	28⅝	32
Masonite	49⅝	62
Mead Corp.	20⅞	22¼
Same Preferred	87½	• 88-90
Same 2nd Preferred	• 40⅜-44	• 44-46½
National Container	7⅜	8
Paraffine Cos.	14¼	16¼
Same Preferred	• 96-100	100¼
Rayonier, Inc.	32½	32⅞
Same Preferred	• 32-32⅜	34
Scott Paper	83¼	• 92-92½
Same $3.40 Preferred	• 99¼-100½	*100¼-100½
Same $4.00 Preferred	*107-108¼	*108-109
St. Regis	9¼	8⅝
Same Preferred	86	87
Sutherland Paper	36½	40¾
Same Preferred	*105¾-105¾	*110 -11
Union Bag & Paper	29½	31⅝
Union Board & Carton	9⅛	9¾
United Wall Paper	2⅜	• 3¼-3⅝
Same Preferred	• 23-25	• 23-25
U. S. Gypsum	97⅜	128
Same Preferred	*181-184	*184-185½
West Va P & P Co.	48	53
Same Preferred	*107-108	*109¾-110

New York Stock Exchange—Bonds

	July 20	June 20
A.P.W. Products 3%	—	81
Celotex 3½%	—	101½
Champion P. & F. Co. 3%	103	103
Mead Corp. 3%	—	102½

New York Curb Exchange—Stocks

	July 20	June 20
Am Writing	7	• 6⅜-7
Great Northern	39½	40⅝

* Closing Bid and Asked Prices

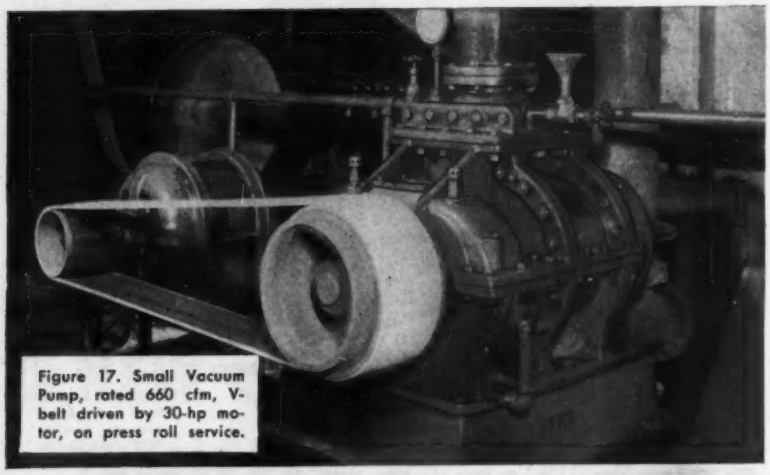

Figure 17. Small Vacuum Pump, rated 660 cfm, V-belt driven by 30-hp motor, on press roll service.

STUMPED WITH A VACUUM PUMP PROBLEM?

Then check ROOTS-CONNERSVILLE'S wide line of standard sizes, fitted to meet paper mill needs.

Supplying the proper Cycloidal Vacuum Pump for use on suction rolls, press rolls, felt conditioners and flat boxes has been an R-C specialty for many years. Users obtain excellent performance and economy from R-C Vacuum Pumps because of these features:

High volumetric efficiencies—accurately maintained clearances, effectively sealed by water, insure high efficiencies; air being handled can be dry, or contain vapors or liquids.

Low friction losses—due to no contact between impellers or impellers and casings.

Higher speeds—permitting direct connection to standard motors, saving first cost, space, and weight.

Flexibility—to meet varying vacuum requirements; suction automatically created to overcome resistance in system.

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Next time you have a vacuum pump problem on new installations, or replacements, ask us for recommendations on how to solve it, without obligation.

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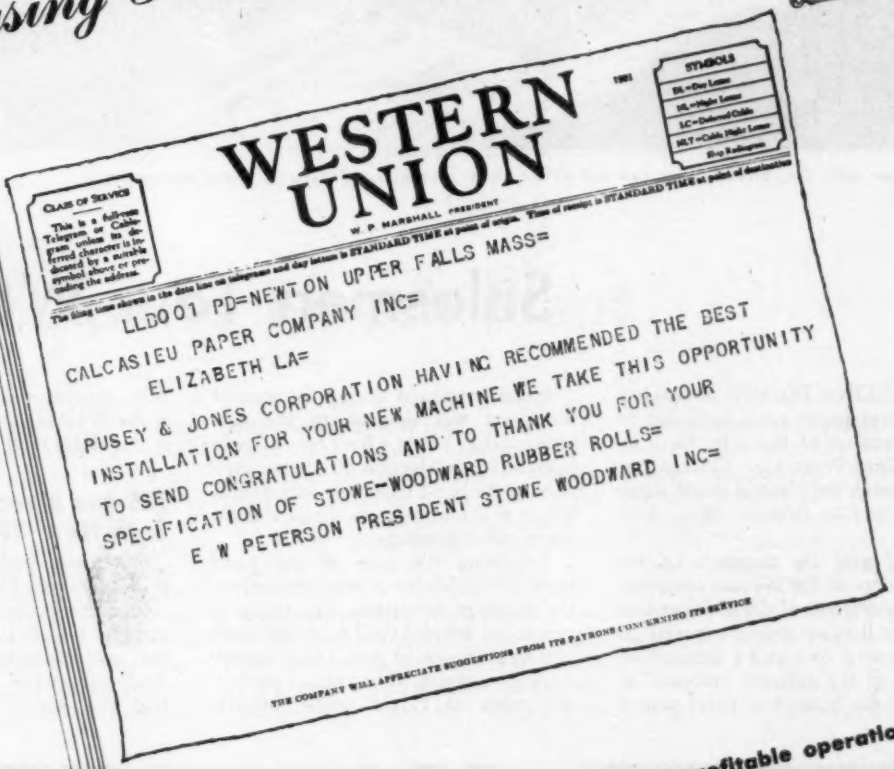
BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

Another name joins the Blue Book of Paper Manufacturers using Stowe-Woodward rubber rolls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CALCASIEU PAPER COMPANY INC=
ELIZABETH LA=
PUSEY & JONES CORPORATION HAVING RECOMMENDED THE BEST
INSTALLATION FOR YOUR NEW MACHINE WE TAKE THIS OPPORTUNITY
TO SEND CONGRATULATIONS AND TO THANK YOU FOR YOUR
SPECIFICATION OF STOWE-WOODWARD RUBBER ROLLS=
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THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

Wherever paper is made Stowe-Woodward rolls assure efficient and profitable operation.

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Craftsmen in rubber

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Wausau Paper Mills Co., Brokaw, Wis.; new half-million dollar bleach plant is latest of many improvements

Salesmen Tour Wausau's

▶▶▶ THE FINE POINTS of making quality bond paper were unfolded to twenty members of the sales force of the Berkshire Paper Co., Chicago, on a tour through the plant of the Wausau Paper Mills Co., Brokaw, Wis., June 26.

Accompanied by members of the Chicago office of the Wausau company, the representatives of the Chicago firm rolled into Brokaw aboard a special car for the general tour and a detailed explanation of the different processes involved in the making of bond papers.

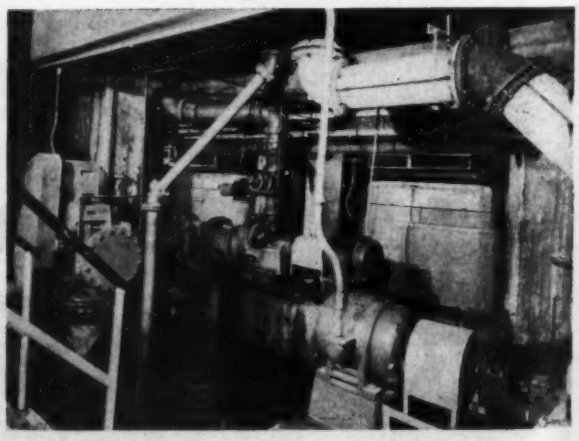
Special emphasis during the tour of the plant was devoted to the new bleach plant, where a finer type of pulp is made for production of a better type of sulphite bond paper for letterheads, ledger and mimeograph sheets and for use in offset printing.

Following the tour of the plant under the guidance of plant executives, the visiting delegation was taken in cars to the Merrill Golf Club for lunch and an afternoon of golf. Later, the visitors were guests at a cocktail party at the home of David Smith, Merrill, Wis., president and general manager of the Wausau company, and at dinner at the Hotel Badger.

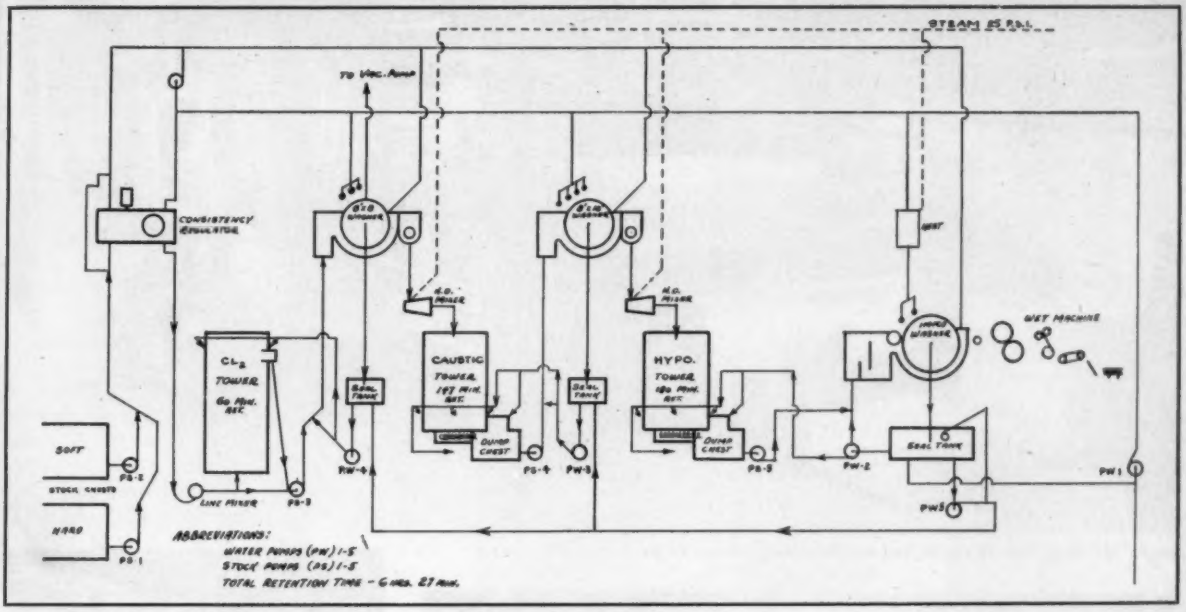
125-ton Bleach Plant Sets New Standards

A ten-year period of improvements at the Wausau Paper Mills plant has culminated in the very latest in modern sulphite bleachplants. Completion of the new six-story brick structure already has set new standards in production and quality.

Wausau's sulphite superintendent, Ejnar Gisselman explains operation of bleaching process to visiting salesmen



Chlorine and pulp are mixed by Impco unit (left); gear reduction sets for bleaching tower agitators (back)



Flow diagram of new three-stage, continuous sulphite bleaching process

New Sulphite Bleach Plant

By comparison, the three former Fletcher single-stage, high density bleachers were out-dated by the number of changes at the mill in recent years. Two of the old bleacher units were installed in 1924. Another of the same type was added as late as 1944. Their capacities were rated at 55 tons per day. Increased production demands of war years forced the performance, and the bleach plant problems soon were on the increase. Bottlenecks soon were reflected in the blue prints of planned improvements. Construction costs were high, but the mill needed new bleaching facilities. These things were obvious. The Wausau paper mill was a growing operation. Newer methods and machines were being introduced. The Wausau mill must continue to meet the challenge of a customer market.

Continuous Bleach Process

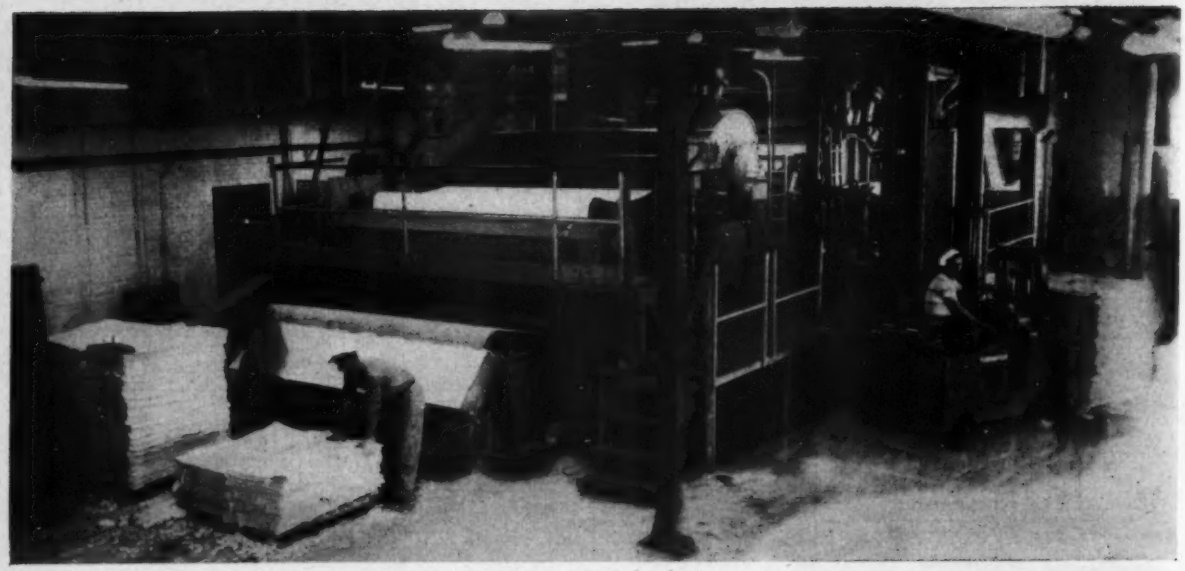
After careful study it was decided that a three-stage continuous bleaching process would fit future production plans. The plant was designed to handle up to 125 tons of stock over a 24-hour period. Treatment of stock is in the following stages: (1) low density, chlorination; (2) high density, caustic extraction; (3) high density, hypochlorite, bleaching.

The continuous upward surge of stock through the first of the three towers is controlled by a De Zurik consistency regulator with an Impco stock volume meter. These are mounted in a common tile vat.

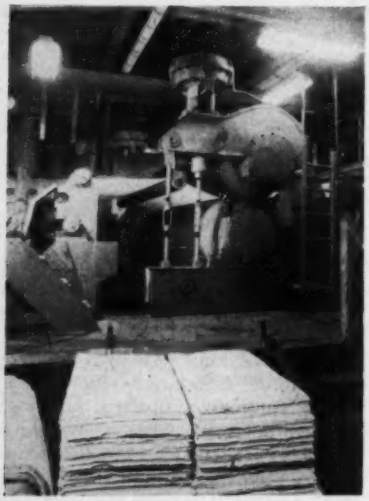
In the initial stage, pulp is mixed with chlorine gas. Special safety pre-

Oliver 1st-stage washer (left) and Impco 2nd-stage washer (right) with Reliance motor drives

Impco high density stock mixers ahead of the caustic and hypochlorite retention towers

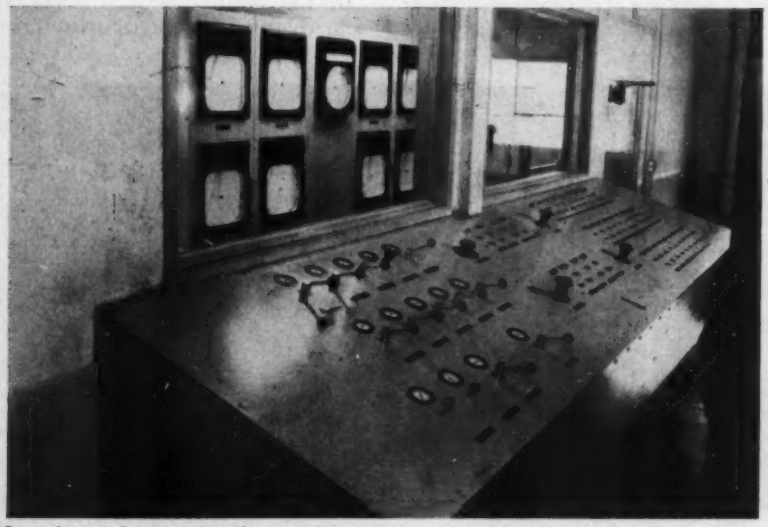


Impco 3rd-stage vacuum washer and wet machine produces 44 per cent air-dry sheets



Press section of wet machine

Pallets of pulp stacked by Towmotor



Central control station Bristol instruments record various operations of the continuous bleaching process

Man-lift elevator saves energy and improves efficiency (Humphrey Elevator Co.)

cautions are taken to insure continued flow of the chlorine from tank car storage to this point. Lines are identified by color. An expansion chamber allows for any variation in pressure. Meters, valves, and all fittings stand rigid inspection daily.

The Impco rubber-lined chemical mixer is located at the base of the first stage tower. These concrete retention towers are 14 ft. ID, 45 ft. high, and tile lined.

As the stock is forced upward, a series of rubber-covered agitator arms keep the chlorinated stock in motion. After an hour of retention time the 3½ per cent stock at the overflow level is skimmed off with a rubber-covered plow arm. This is mounted on the rubberized agitator shaft. White water is added and the chlorinated stock is pumped to a 6 x 8 ft. double roll Oliver washer. Pulp comes off the Oliver at a 10 per cent consistency and drops to a screw conveyor which breaks up the pulp mat. Washers are equipped with Reliance variable speed drives.

High Density Operations

At this point the pulp moves to an Impco double shaft mixer unit at the floor below where caustic treatment begins. The mixer has a steam injector and raises the temperature of the stock to 120 to 140 F. Heat at this point insures proper caustic treatment. Mixing continues as the unit discharges the stock to the top side of the second tile-lined tower. Here the flow of stock is downward. After three hours of retention time the pulp is again diluted, and special screw ejectors draw the stock from the lower side to agitated tile-lined dump chests. A pumping consistency of about 2½ per cent is maintained to keep a continuous flow of pulp to the next stage washer. This 8 x 10 ft. Impco single roll washer-thickener with showers discharges to a screw conveyor. Again the stock is shredded before it drops to the next Impco mixer. Hypochlorite bleach solution and steam are injected as the pulp passes through the mixer and drops to a third high density bleach retention tower. This tower is also tile lined. Stock is kept in motion approximately three hours before the bottom ejectors draw the pulp and prepare for the final wash. Tile-lined towers, vats, and tanks were built by Chemical Linings, Inc.

Impco Wet Machine

One of the important features in the new Wausau plant is the recently installed Improved Paper Machinery Corporation's 8 x 10 ft. combination vacuum washer wet machine with a Reliance drive. Bleached stock is pumped from the third stage dump chest to the washer section of this machine. The pulp mat formed at the washer is moved through three press rolls—a forming roll and then to two grooved hydraulic press rolls. A pulp shredder is installed for slushing the lap pulp for startup or changeover periods.

In production the sheet passes from the two hydraulic press rolls to slitter and cutter rolls. A series of short conveyor belts move the three-sectioned sheet, each 24 in. x 40 in., to an inclined unloading rack. Two stackers inspect the pulp and keep the racks clear. Pulp sheets are double stacked on 40 in. x 48 in. pallets, graded, and moved to nearby storage areas.

Operation and Controls

The top floor of the new six-story bleach plant houses the latest in control equipment, supplied mainly by the Bristol Co. To compensate for the corrosive nature of bleach chemicals, the controls are inside a pressurized room. This is accomplished with a number of intake fans pulling outside air, and a forced ventilation of the recording panels and the console control cabinet.

Since two men can check and regulate the performance of all bleaching equipment, flow of stock, etc., it might be called the "nerve center" of the entire operation. Among the control section are twelve hydraulically operated valves for stock and water, and two pneumatic valve controls for makeup water at the supply chests. Temperatures and stock levels at each stage are automatically recorded. The flow of stock and chemicals at each of the three stages is a detail of constant check and record. The large 4 ft. x 16 ft. console panel is equipped with a signal system which spot-checks any irregularities for operators.

Additional Facilities

The new building was large enough to make way for a new engineering department, a dark room for blue print and photostatic work, and an instrument repair and maintenance department. In addition, the new buliding also provided several new modern office spaces for supervisors in charge of sulphite operations.

Changeover to the new bleaching system was completed during April, 1950. While this is a new plant, the company continues to improve its bleaching processes. In operation shortly will be a 2000-lb. capacity Jones Pulp-Master and a Dilts refiner. This is the latest in rapid de-fibring equipment. The installation will tend to close the gap between present and rated capacities of the new plant, and should mark improvements in bleaching.

Who's Who at Wausau Paper Mill Company

D. C. EVEREST
Chairman of the Board

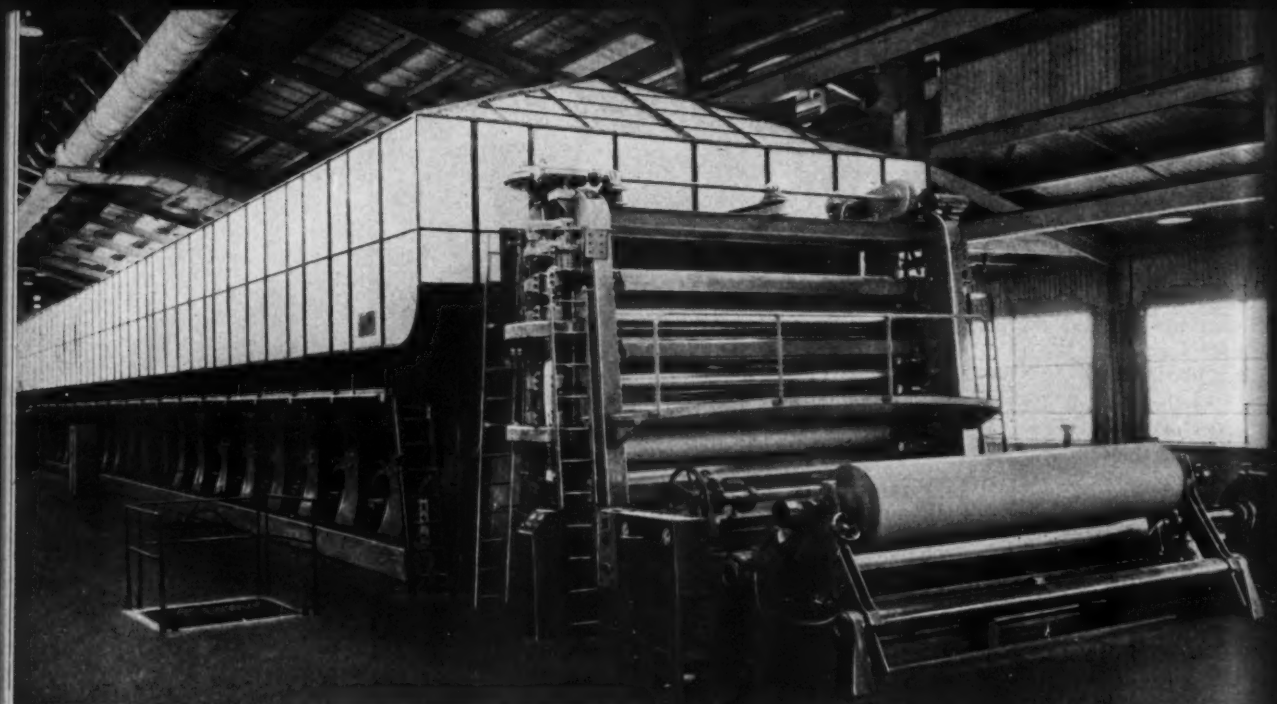
D. B. SMITH
President & General Manager

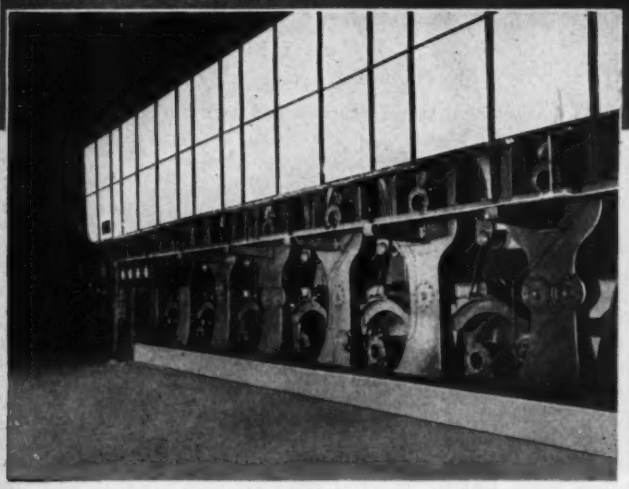
CECIL TAYLOR
Superintendent General

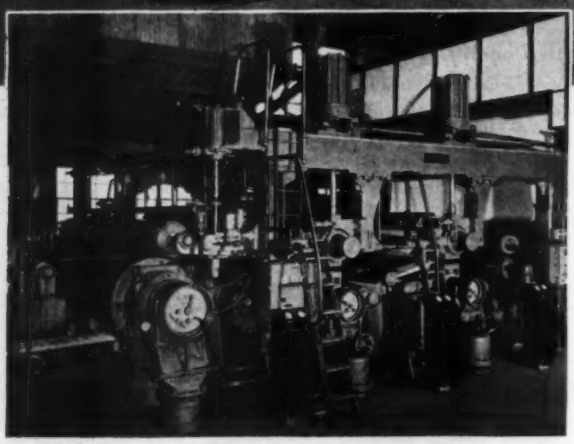
OTTO KUEMMERLING
Technical Superintendent

EJNAR GISSELMAN
Sulphite Superintendent

DONALD CALKINS
Plant Engineer







FEATURES OF 160" PUSEYJONES FOURDRINIER MACHINE AT CALCASIEU

Improved type Flow Spreader combined with 10 ft. high adjustable stainless clad slice.

Fourdrinier Part suitable for a wire 100 ft. long and 160" wide, equipped with 36" suction couch, lump breaker roll with improved raising and lowering mechanism, 8–7" wide suction boxes, dandy roll, "Rapi-drape" wire changing device, and adjustable wire pitch arrangement.

Press Part of Simplex close-coupled design with 28" rubber covered first and second main presses and Vickery felt conditioners.

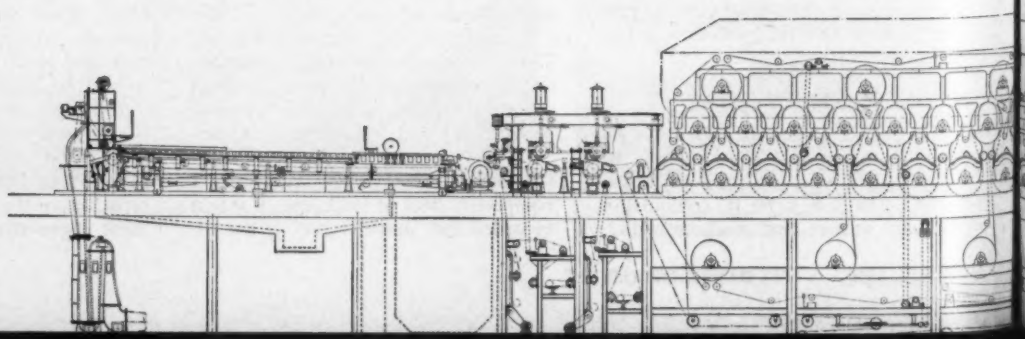
Dry Part in two main sections having one upper and lower felt on each section; first section comprises 20–60" paper and 4–60" felt dryers; second section comprises 20–60" paper and 2–60" felt dryers; Bowser lubricating system for main dryer bearings and gearing; rope carrier device for threading the sheet through the dryer sections; improved type enclosed gearing; latest type steam joints with dual revolving siphons.

Calender Stack comprising 8 rolls with independent Bowser oiling system for all roll bearings; also pneumatic nip loading system.

Pope type Uniform Speed Reel of improved design, with pneumatic adjustable loading mechanism.

Unwinding stands with water-cooled friction brake.

Puseyjones Winder with hydraulic-operated roll unloading mechanism.



..ine drawing of new ma-
:hine. Designed and con-
tructed for maximum oper-
.ting speed of 1500 feet per
ninute of Kraft bag and
vrapping papers with G.E.
ectional motor drive.

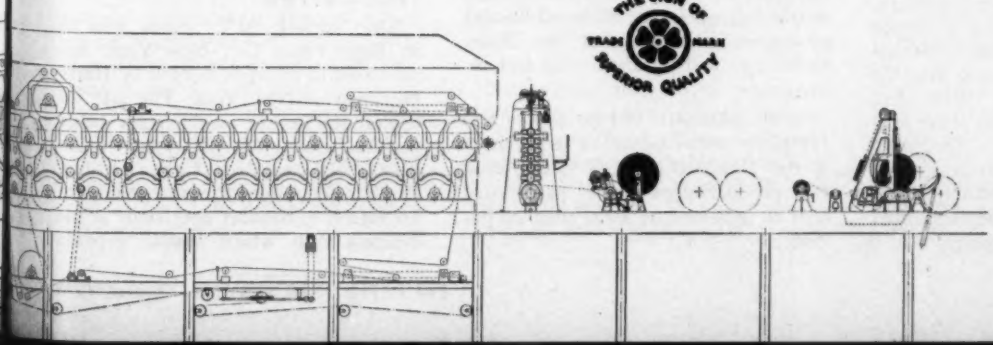
MORE PRODUCTION FOR CALCASIEU

Shown here is the new 160-inch Puseyjones Fourdrinier Machine in operation in the new, modern plant addition of the Calcasieu Paper Company Plant, Elizabeth, La., the latest unit installed in the South for the production of Kraft bag and wrapping paper. The latest features in machine design from Wet End to Winder have been incorporated in this new machine for more efficient, higher tonnage Kraft production.

Whether your plans call for the installation of completely new machines, or replacement of individual equipment, call in Puseyjones, builders of high-speed, quality machines.

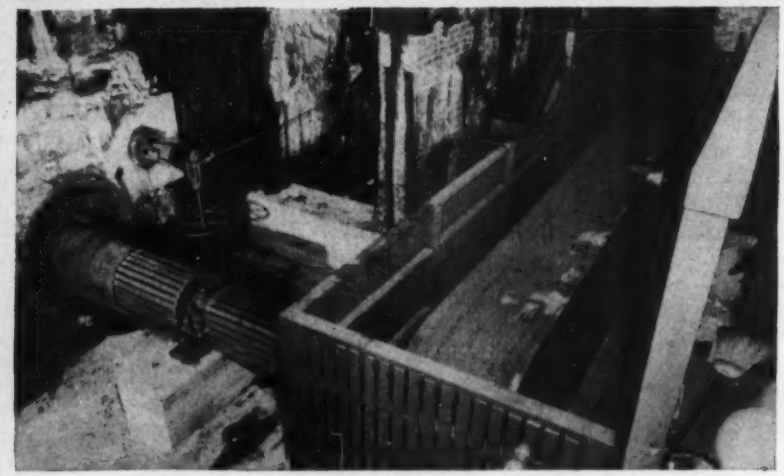
THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY



All rolls and rotating parts in the new Puseyjones Fourdrinier Machine at Calcasieu, with the exception of the lower calender roll, are equipped throughout with anti-friction bearings.

United Board and Carton to Discard Old Water Wheel



Spillway under plant (above) delivers water to hydrogenerators and to the old mechanical water wheel that is belted to the lineshaft (lower rear.) Lineshaft now drives three beaters that will be motorized when the water wheel installation is dismantled.

Thompson (N. Y.) Mill to Revamp Power Set-up

Three transformers will be installed this summer at the Thomson, N.Y., plant of United Board and Carton Corp. This change will make it possible for the company to purchase supplemental electric power from the Niagara Hudson Corp. The purchased power will supplement the plant's own hydroelectric power system to insure continuous production of quality paperboard during poor water conditions.

Just north of the plant, a V-shaped dam across the Hudson River channels water through a short canal into the spillways under the mill. With ideal water conditions, when the water is at 16-ft. head level, the plant's five hydrogenerators and one mechanical water wheel produce approximately 2250 hp., which is the total demand load. During the winter, however, ice is responsible for many temporary shutdowns.

Three of the plant's five hydrogenerators were installed in 1942. Producing 320 hp. each, the generators increased electric power at the plant which is used to replace some mechanical water wheel installations. There is still one mechanical wheel called the "Rube Goldberg," which powers three of the mill's five beaters.

When purchased power is available, the plant will be completely motorized to take full advantage of the additional power, which means that the "Rube Goldberg" will be dismantled and retired.

With additional electric power and complete motorization of equipment at the Thomson plant, it is estimated that production of quality paperboard will be increased by more than 20 per cent.

Bromptonville (Que.) Plant to Reopen—New Company Will Operate

A new company will reopen the Brompton Pulp & Paper Co. plant at Bromptonville, Quebec, shut down since May, 1949. This plant manufactured newsprint, and it will be opened for newsprint production.

At the time the mill was closed, the City of Sherbrooke purchased the company's waterpower rights. At that time, it was stated that the buildings would be sold. The buildings were subsequently optioned for $400,000 to a U. S. firm, Reliance Enterprises, Inc., which has formed the Richmond Pulp & Paper Co., a Quebec incorporation to operate the mill.

Under the agreement, the company also has leased the 10,000-hp. plant for a ten-year period. In the new setup, Gene H. Kruger and B. G. Kruger, of Kruger Paper Co., Montreal, are understood to have a controlling interest. The Krugers formerly held a controlling interest in Dominion Foils (Canada) Ltd. which they sold last fall.

The new operators state that pulpwood supplies to support the operation have been provided.

Printing Institute Has New Building

A new building has been acquired by the Printing Institute, Philadelphia school for the graphic arts industry. The new building, which will contain about 9000 square feet of space, will be occupied by the school September 1.

Printing Institute was established early in 1948 as a private printing trade school; its rapid growth since that time has placed it in a unique and important position in the field of printing education in this country. In addition to training men for the graphic arts, the school conducts many activities solely in the interests of the industry.

St. Regis Sells Norfolk Mill—Production Transferred

The Norfolk, N.Y., paper mill of St. Regis Paper Co., New York, has been sold to interests headed by Harry Pearlman of New York. The sale includes real estate and certain other physical assets. Mr. Pearlman, president of National Paper Corp., Ransom, Pa., has announced that the new owners intend to conduct operations at the Norfolk mill which should provide

a high employment level for the community.

Facilities installed at the Norfolk mill include 12 pocket grinders, three sulphite digesters and two fourdrinier paper machines with trims of 91 to 150 inches; pulp manufacturing equipment includes facilities for bleaching all pulp produced at the mill.

St. Regis production formerly accomplished at Norfolk will be transferred to other company mills at Deferiet, N.Y., Bucksport, Me., Kalamazoo, Mich., and Sartell, Minn.

U. S. Commerce Bureau Undergoes Reorganization

A reorganization of the Bureau of Foreign and Domestic Commerce has been announced by the Secretary of Commerce which relates activities of the Office of International Trade and the Office of Domestic Commerce. Under the reorganization, a new office of Industry and Commerce, under the directorship of H. B. McCoy, has been established; all industry-commodity units of the Bureau of Foreign and Domestic Commerce are merged in the new office.

Concurrently, a new Forest Products Division, headed by H. E. Holman, has been formed to combine the Forest Products Divisions of the Office of International Trade and the Office of Domestic Commerce. Units of this Division are Primary Forest Products, headed by A. E. Fivaz; Lumber, with J. L. Muller as chief; and Pulp and Paper, under direction of W. L. Neubrech.

INSTALLATION OF FORTY-SEVEN jacketed steel dryer rolls on two fourdrinier machines at the Woodland, Me., newsprint plant of St. Croix Paper Co. will begin soon. The jacketed rolls, to be supplied by Lukenweld division of Lukens Steel Co., Coatesville, Pa., will replace dryers of another construction type. The dryers, all 48 inches in diameter with 164 inch face, will be used on two machines.

A NEW CONTRACT HAS BEEN signed between the Southern Kraft Division of International Paper Co. and company employees at Mobile, Ala., Moss Point, Miss., Panama City, Fla., Georgetown, S.C., Bastrop, La., Camden, Ark., and Springfield, La. The one year agreement with five A.F.of L. unions representing the workers provides wage increases from five to seven cents an hour, and liberalizes pension and vacation plans.

A COMPLETE SURVEY OF STEAM and power supply for Gardner Board and Carton's three plants in Lockland and Middletown, Ohio, will be made by Myers & Addington, consulting engineers.

TWO FELLOWSHIPS FOR study of its company organization and operation under a national program designed to encourage exchange of information between college staff members and businessmen have been granted by Bemis Bro. Bag Co., St. Louis. Granted through co-operation with The Foundation for Economic Education, Inc., business firms pay participating students their transportation costs and a sum for living expenses during a 6-week study period designed to acquaint teachers with actual business conditions, and business firms with problems faced in the classroom.

EXCESSIVE DEMANDS BY LABOR for increased wages may cause the liquidation of Rushmore Paper Mills, Inc., plants at Natural Dam and Governeur, N.Y. Unless the workers drop demands for wage increase of 11 cents per hour, paid vacations for workers with fifteen years employment, and other benefits, the company will decide on complete dismemberment of operations. This would result in the dismissal of 240 union workers who went on strike June 20, as well as that of all administrative sales and supervisory employees.

A PLAQUE HONORING the memory of the fifteen former employees of West Virginia Pulp and Paper Co., who gave their lives during World War II has been placed in the company's main offices at Troy, N.Y.

DIRECTORS OF GREAT Lakes Paper Co. Ltd., Fort William, Ont., are considering the installation of a third paper machine. A spectacular demand for newsprint is the reason for the proposed $5,000,000 to $8,000,000 installation.

Import Notes

Official Government import statistics for 1949, which have just become available, have enabled the Import Committee of the American Paper Industry to further analyze the effects of Reciprocal Trade Agreements on duty rates on paper. Based on tariff rates in effect before the Annecy reductions which became effective prior to June 1, the weighted average duty rate on all grades of dutiable papers was 12.28 per cent, according to Warren B. Bullock, manager of the Committee. The reductions at Annecy were so severe that the present average rate of duty, computed on imports of dutiable papers in 1949, is only 8.49 per cent. Proposed duty rate reductions on items scheduled for consideration at Torquay would cut this average to little more than 5 per cent. Recognition of this danger has resulted in a flood of protests to Washington from manufacturers and paper mill workers alike. In no case are present duty rates equivalent to the amount of the depreciation of foreign currencies, with the result that any foreign producer can ship into this market after paying duty, at a premium over current domestic costs of production.

After more than three years, the Administration has utilized the so-called escape clause of the Reciprocal Trade Agreement with Mexico to nullify the concessions granted by this country to Mexico. In 1947 Mexico abrogated the concessions it granted the United States in its 1942 agreement, but this Government allowed its concessions to Mexico to continue for three years. The United States cancellation of its agreement becomes effective in December, but many of the cancelled concessions are scheduled to be granted other nations at Torquay. Consequently Mexico, under most favored nation provisions of these agreements, will continue to enjoy the benefits of these concessions without granting anything in return.

Laminated tag board from Sweden, at first thought to be bristol, has been classified by Customs officials on the opinion of domestic manufacturers as a laminated paperboard, at a lower rate than that for bristol.

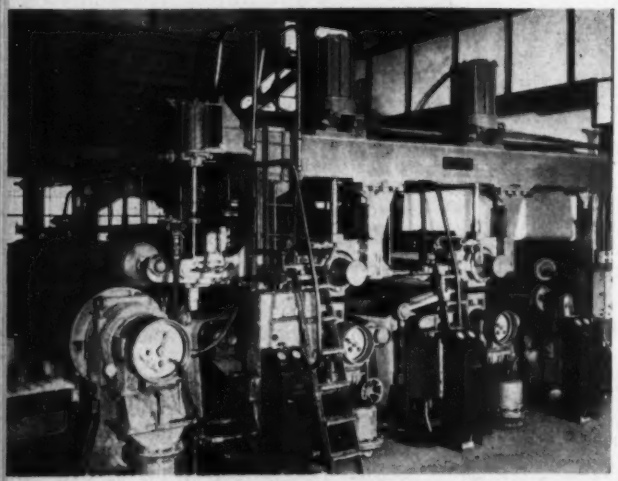
Fifteen shipments of Finnish kraft paper have been held by Philadelphia officials to have been undervalued by incorrect computations of the Finnish inland freight. Three similar cases at New York have been protested by the importers, as well as one shipment of Japanese coated paper, four of Japanese tissue paper and one of French drawing paper, inland freight being the issue in these cases also.

Import statistics for May show the effect of the depreciation of foreign currencies on the value of imported papers. Although imports of dutiable papers and paperboards were 2000 tons greater in the five months ending May 31 than for the same period in 1949, the aggregate value decreased $300,000.

Calcasieu Paper Co.

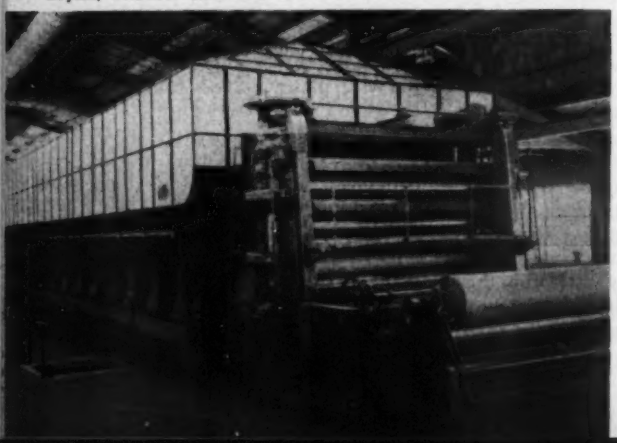
RICHARD W. PORTER
Editorial Director, The Paper Industry

Pusey & Jones 160-inch fourdrinier paper machine



Pneumatic loaded presses with Mason-Neilan controls

Dryers, calender and reel; J. O. Ross hood



▸▸▸ IN THE HEART of Louisiana's forest country, the Calcasieu Paper Co., at Elizabeth, has built a new kraft pulp and paper mill to replace the obsolete plant built a quarter of a century ago.

When controlling interest of the Calcasieu Paper Co., Elizabeth, La., was purchased by the Jacksonville Paper Co. in 1946, one of its first moves was to plan an expansion and integration program. Well known as a producer of high quality kraft paper, Calcasieu had been turning out about 60 tons per day in its old mill, built originally in 1926. Now, after an expenditure of nearly seven million dollars, the enlarged pulp and paper mill has a capacity of over 200 tons per day.

The Jacksonville Paper Co. with headquarters in Jacksonville, has 17 branches in Florida, Georgia, Alabama, North Carolina, and South Carolina. A subsidiary, Southern Industries Co., was formed in the mid 1930's with a converting plant in Jacksonville. Then in 1947, after the parent company acquired control of Calcasieu, Southern Industries Co. built a converting plant at Elizabeth to further integrate the whole Calcasieu operation. The paper mill manufactures kraft bag, wrapping and butcher papers for sale as well as for its associated converting plant. The converting plants turn out a wide variety of bags and sacks including those used for hardware, garments, millinery, notions, groceries, meal, sugar, potatoes, etc.

Executive offices are at Jacksonville, Fla. Clifford G. McGehee is president and chairman of the board. Other officers include M. R. McGehee, secretary and treasurer; C. C. McGehee, vice president; Tillman Cavert, Jr., vice president, and T. R. McGehee, assistant to the president.

At the mill offices in Elizabeth, La., are Edward K. Ahrens, vice president and general manager; J. E. Bond, assistant treasurer; W. L. Vignes, production manager; Lee Howard, Jr., chief engineer; B. A. McMahon, forester; W. M. Cunningham, purchasing agent; A. A. Cavanaugh, personnel manager; G. W. Mullins, Sr., paper mill superintendent; C. J. Hanchey, assistant paper mill superintendent; Dennis Sirman, chief electrician; L. C. Gill, Sr., maintenance superintendent; L. J. East, steam superintendent, and J. D. Collins, finishing room superintendent. About 425 persons are employed in the Calcasieu mill and about 125 in the Southern Industries Co. converting plant.

Design and engineering of the new mill were handled by Alvin H. Johnson Co., New York. General contractor was H. K. Ferguson Co., Cleveland.

What's New

Actually, an entirely new kraft mill has been built at Calcasieu and includes a wood mill, digesters, washers, screens, recovery plant, causticizing system, stock preparation system, paper machine, and new steam generation and power equipment. Old equipment still operating consists of two digesters, refining equipment, the original 108-inch Beloit fourdrinier, and the old power plant. Discontinued are the old diffusers, recovery and liquor making systems, and the old wood mill.

shuts down old mill—starts up new

Elizabeth is an old sawmill town on a creek that flows about 10 miles to the Calcasieu River. Water for mill operation is pumped from wells. Mill effluent, impounded in ponds, seeps and overflows to the creek and is also discharged at periods of high water.

While some wood is purchased throughout the area, the company owns a 30,000 acre timber tract operated in accordance with modern forestry practice. Much of the pulpwood now used is harvested from company owned lands. The mill is served by the Santa Fe Railroad which provides transportation for raw materials as well as finished products.

Wood Mill

Wood is received by rail and truck and is stored in the yard or unloaded direct to the wood conveyor. The chain conveyor takes the wood to the new 12 x 45-ft. M-bar drum barker furnished by Fibre Making Processes, Inc. From the barking drum, clean wood is conveyed to the 10-knife, 88-inch diam. Murray chipper. It is powered by a 350 hp. G-E induction motor through a V-belt drive. Link-Belt equipment is used extensively in the wood preparation department as well as throughout the mill.

Chips drop from the chipper to a belt conveyor, from which they discharge to the spreaders above two Tyler-Niagara vibrating screens. Oversize chips or rejects from the screens are reduced in a hammermill, then returned to the screens. Fines fall to a hopper and drop onto a belt which discharges to the bark conveyor system leading to the bark furnace. Accepted chips are conveyed via a Link-Belt elevator and belt conveyors to the chip hoppers above the digesters. The main chip conveyor discharges to a shuttle conveyor belt that fills the individual hoppers as desired.

Digester Room

The new digester building contains four new Blaw-Knox cylindrical rotary tumbling digesters which operate in addition to the two old tumbling type digesters. Digesters are stainless steel lined and equipped with Electric Steel Foundry Co. (Esco) hand-operated stainless steel blow valves. Each of the 10 ft. diam. x 28½ ft. long digesters yields about four tons of pulp per cook.

Digesters rotate through worm gear arrangements at the rate of one revolution every seven minutes and are driven by G-E motors through Falk gear reducers. Each digester is driven from one side, while on the other side the trunnion is hollow and hooked up with a rotary joint to the liquor tanks and the steam header. On the same end as the blow valve is a 1-inch gas-off valve, which is connected by means of a union to the flexible end section of the gas-off line. When the digesters are blown, they are rotated so that the blow valve is at the bottom and the blow pipe is hooked to the valve. Individual digesters are all hooked up to a common blow pipe that leads to the 32-ton blow tank built by Ingalls Iron Works. Flash steam from the blow tank goes to a cyclone and then discharges to the atmosphere with no heat recovery.

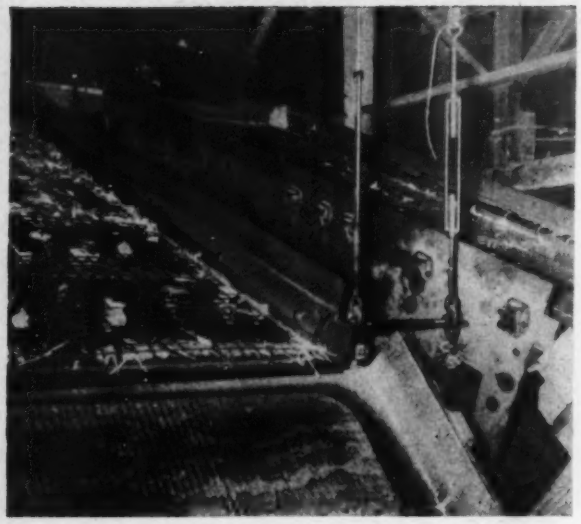
For each digester there is an individual white liquor tank, each of which will hold enough white liquor for two cooks. One feature of the tumbling digester in contrast to the stationary digester is that it is unnecessary to fill the volume with black liquor since the tumbling action of the rotary digester insures good mixing and circulation.

Total cooking cycle is about three hours. The digester is

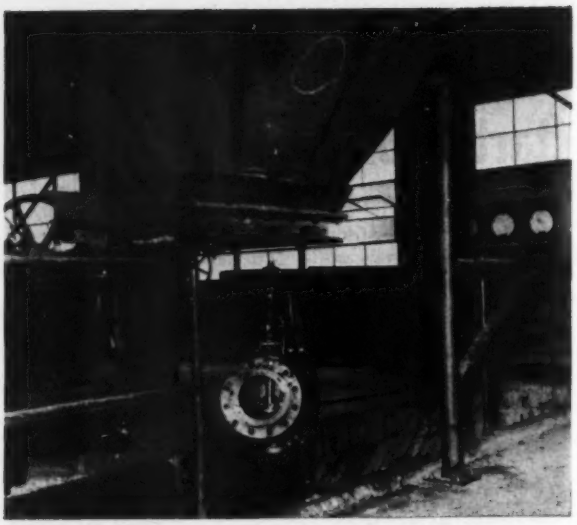
B & W boiler with ABCO bark furnace and Thermix stack

FMP M-bar chain suspended drum barker

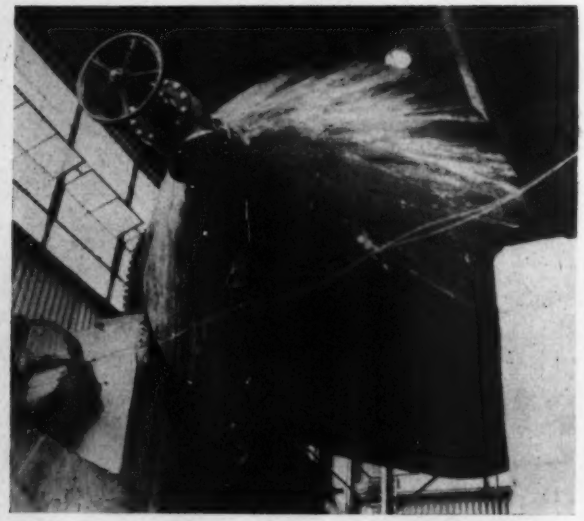
Murray wood chipper with V-belt drive and 350-hp. G-E motor



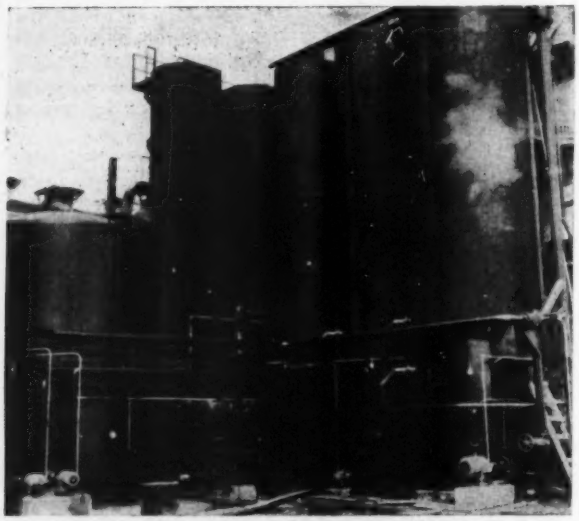
Two Tyler-Niagara vibrating chip screens



Digester operating floor—Esco SS blow valve, Foxboro controls

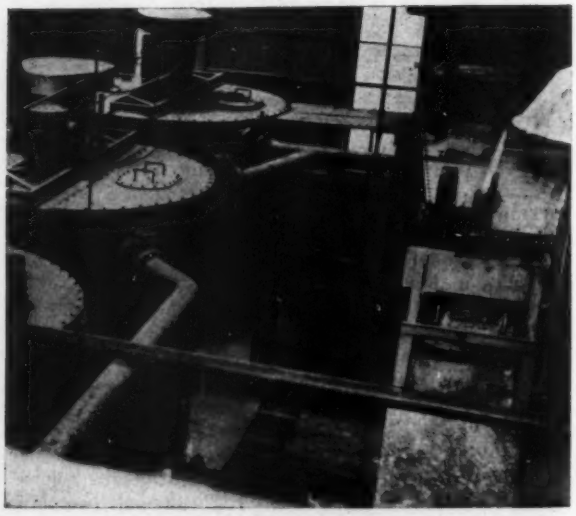


One of four new Blaw-Knox tumbling type SS lined digesters



General American 5-body 5-effect black liquor evaporator

B & W Tomlinson recovery furnace



Dorrco slaker (right) and 3-stage causticizing system

charged with chips and liquor and steamed. During steaming, the gas-off line is hooked up. After about 35 minutes, the gas-off valve is closed, the line disconnected, and the digester then rotated with steam pressure at 140 psi. After the digester is stopped the contents are sampled. Then pressure is relieved for 25 minutes until it is reduced to about 75 psi, at which time it is blown.

Digester instruments are Foxboro. The digesters are manually controlled, but a Foxboro pressure recorder on each digester guides the operation. On the same panel is a liquid level recorder for the white liquor storage tank, liquid level in the blow tank, and steam flow meter.

Washing and Screening

From the blow tank, the stock is pumped to an Impco stock meter and De Zurik consistency regulator. This feeds by gravity to a battery of two Impco vibrating de-knotters. Rejects from the de-knotters drop to a Link-Belt screw conveyor and are taken back to a knot bin. The old No. 1 digester is used for re-cooking knots and screenings. The screenings from the tailing reject flat screen also drop into the screw conveyor and are sent with the knots for re-cooking.

After the knots are removed, the accepted stock is washed in two stages on two 8 x 12 ft. Impco rotary vacuum washers driven by G-E variable speed drives. The instrument panel contains a G-E push-button operating station and Foxboro instruments. Space is available and foundations are in for the installation of a third washer drum.

Brown stock washers are equipped with individual filtrate tanks and a foam tower equipped with an Impco centrifugal foam breaker. From the No. 1 filtrate tank, weak black liquor is pumped to storage from which it is pumped to the evaporators. Filtrate tanks, liquor storage tanks, and most of the other steel tanks in the new mill were supplied by Ingalls Iron Works.

From the washers, the re-pulped stock drops to a stock chest. Washed stock in the chest is adjusted to a consistency of about 6 per cent by a Trimbey consistency regulator. It is then pumped to a steel trough or head box, which feeds the four V-belt driven Trimbey rotary screens. From the screens, the accepted stock flows by gravity to an 8 x 10 ft. Oliver filter where it is thickened. Thickened stock from this decker is pumped to the decker chest. Consistency is regulated here by a Trimbey consistency regulator. Stock from this chest is pumped to the jordan headbox in back of the paper machine. All stock chests in the new mill are equipped with Shartle propeller type agitators. Most of the stock pumps and water pumps in the pulp mill and paper mill were supplied by Warren Steam Pump Co.

Rejects from the Trimbey screens go to a 16-plate wood vat Impco flat screen. Rejects from the flat screen go to the knotter screw conveyor, while accepted stock goes back to the washed stock chest.

Chemical Recovery

Weak black liquor from the storage tank is pumped to the five-body, quintuple effect, self supporting Conkey (General American Transportation Corp., Process Equipment Div.) evaporators to be concentrated. Black liquor pumps on the evaporators and in the recovery system are Worthington and are controlled from a G-E push-button control station. The Foxboro instrument panel contains a temperature recorder, liquor flow meters to No. 4 and No. 5 effects, and a conductivity meter. An indicating potentiometer shows temperatures at several different points in the evaporator system.

Concentrated liquor from the evaporators is pumped to a strong liquor storage tank and then to a Murray cascade evaporator ahead of the Babcock & Wilcox Tomlinson recovery furnace. This furnace is designed to burn the black

Calcasieu Executives

at general offices in Jacksonville, Florida

C. G. McGehee
President

C. C. McGehee
Vice-President

Tillman Cavert, Jr.
Vice-President

M. R. McGehee
Secretary-Treasurer

T. R. McGehee
Asst. to Pres.

at mill office in Elizabeth, Louisiana

Edward K. Ahrens
Vice-Pres. & Gen. Mgr.

W. L. Vignes
Production Mgr.

Dennis Sirman
Chief Electrician

Lee Howard, Jr.
Chief Engineer

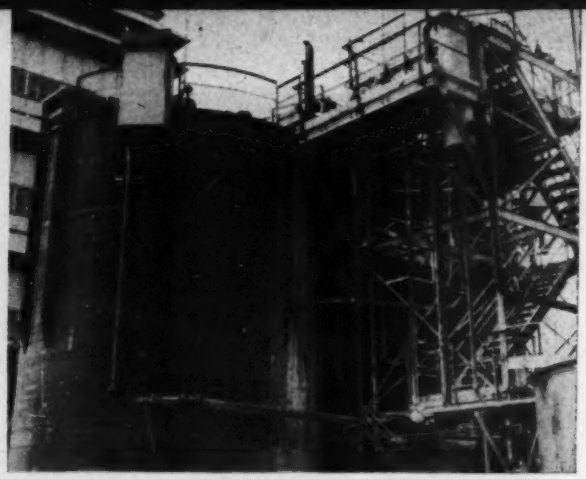
Robt. Fenstermacher
Asst. Ch. Eng.

C. J. Hanchey
Asst. Supt.

A. A. Cavanaugh
Personnel Mgr.

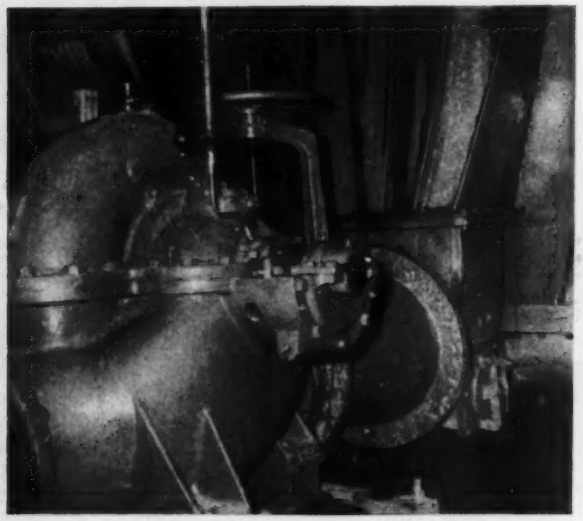
F. W. Bertram

T. J. Miller

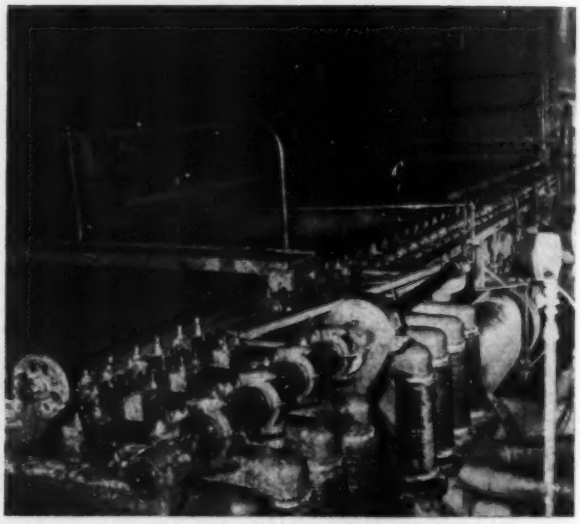


Tray thickeners for liquor classification and lime mud washing

Two of the four Trimbey screens



Allis-Chalmers fan pump and Flow Spreader stock inlet



Fourdrinier part of Pusey & Jones paper machine

liquor from 200 tons (max.) of pulp per day, rated at 86,400 lbs. of steam per hour at 175 psi. The recovery furnace is equipped with Diamond soot blowers, which reduce handlancing to a minimum. It is equipped with an economizer and air heater and is controlled by Bailey instruments.

From the storage tank, salt cake is fed by a screw conveyor to the mixing tank from which the black liquor is pumped to the spray nozzles of the furnace. Flue gas at the boiler drops salt cake and carbon dust to a Jeffrey ash hopper and screw conveyor that takes the dust to a mixing tank, where it is mixed with black liquor and then sent to the cascade evaporators. Flue gas discharges direct to the atmosphere after it passes through the cascade evaporator.

Installed in the recovery plant is a man-lift elevator built by Barnard & Leas Mfg. Co., Inc. This type of elevator provides rapid transportation between floors and saves time and energy.

Liquor Making

Molten smelt from the recovery furnace drops to the dissolving tank where it is dissolved in weak wash liquor to form unclarified green liquor.

White liquor is made in a Dorr continuous causticizing system, modified in that it does not have a green liquor clarifier nor a dregs washer. Unclarified green liquor from the dissolving tank is pumped to a spiral heat exchanger (American Heat Reclaiming Co.) and then goes to the slaker where it is mixed with lime before being pumped to the three continuous causticizing tanks, and then to the white liquor clarifier. Clarified white liquor is pumped to storage, while the mud is washed in two stages in a second Dorr thickener. Washed mud goes to an agitated storage tank, before it is pumped over an Oliver lime mud rotary vacuum filter with a Nash vacuum pump. The mud is then impounded in a pond, since there is no lime kiln for lime reburning. Although the present system also does not include a green liquor clarifier, a dregs washer, or a lime recovery kiln, these will be added in the future, according to present plans.

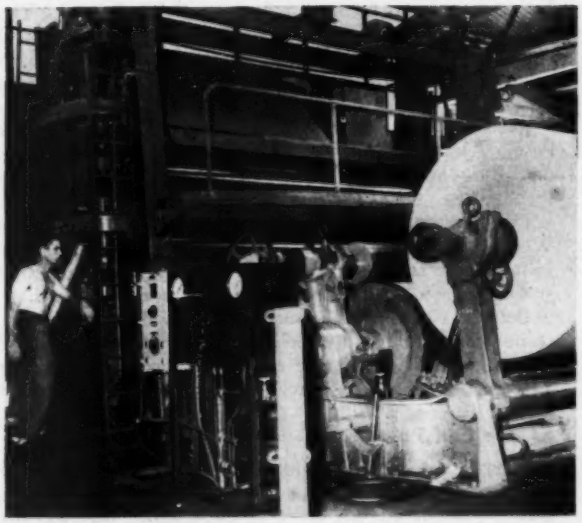
Lime is unloaded from box cars and elevated by a Link-Belt system to the storage tank. This feeds direct to the slaker. The slaker, causticizing tanks, heat exchanger, lime mud filter, control panel and other auxiliaries are located in the causticizing building. The two Dorr thickeners for white liquor clarification and lime mud washing are installed out-of-doors. The control instruments for the causticizing operations are Foxboro and Brown, while liquor pumps were supplied by Worthington.

Stock Preparation

From the decker chest, stock is pumped to the headbox of four No. 4 Emerson jordans. These are driven by 400 hp. G-E synchronous motors. Stock passes through the first two jordans in series, then drops to the machine chest. Consistency from the machine chest is regulated by a Trimbey consistency regulator and then goes to No. 3 and No. 4 jordans

Trimbey consistency regulator with Bristol recorder

Two of the four Emerson No. 4 jordans



Calender stack and reel, Mason-Neilan controls

Pusey & Jones slitter and rewinder

in series. From No. 4 jordan, the stock is pumped to the paper machine headbox, from which it goes to the Allis Chalmers V-belt driven fan pump. On the mezzanine is located an 8 x 10 ft. Oliver filter used as a save-all. White water from the couch pit, suction presses, etc., is pumped to this save-all and the stock is discharged to the machine chest.

Paper Machine

The Pusey & Jones fourdrinier paper machine has a wire 160 in. wide by 100 ft. long and is designed to operate at speeds up to 1500 fpm. Stock and white water mixed in the fan pump is pumped through a Flow Spreader inlet with a 10 ft. high headbox with adjustaable slice. The inlet, headbox and slice are stainless steel lined. The fourdrinier wet end is made up of the breast roll, 35 rubber-covered table rolls, followed by oscillating suction boxes, and a 36-inch diam. suction couch with a rubber covered lump breaker roll. It is equipped with a double shake unit. The adjustable pitch fourdrinier has the Rapi-drape wire changing arrangement. The eight 7-inch wide suction boxes are connected to separator boxes by corrugated rubber hose connections.

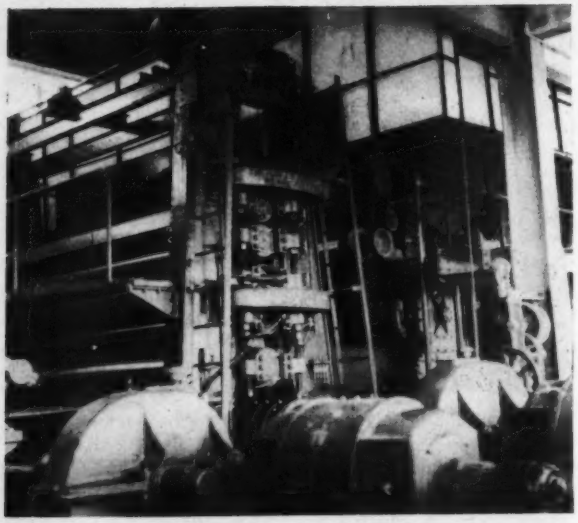
From the couch roll, the sheet passes through two suction presses. Fifty-eight Stowe-Woodward rubber covered rolls used on the machine includes a 26-inch Neoprene upper first press, 26-inch Microrok upper second press, 28¼-inch suction press and a 17-inch lumpbreaker roll.

Press felts on suction presses are equipped with Vickery felt conditioners. Four Nash pumps with V-belt drives and G-E motors supply the vacuum for the flat boxes, suction couch, and first and second main presses. A single Nash pump is hooked up to the Vickery felt conditioners.

Dryers are divided into two main sections having a top and bottom felt on each section. The first section is made up of twenty paper dryers and four felt dryers, while the second section contains twenty paper dryers and two felt dryers. All dryer cylinders are 60 inches in diameter and are driven through a completely enclosed gear section on the back side of the machine. Dryer cylinders are equipped with dual revolving siphons and a Midwest-Fulton drainage and condensate system. The main dryer bearings and gears are lubricated with a Bowser system.

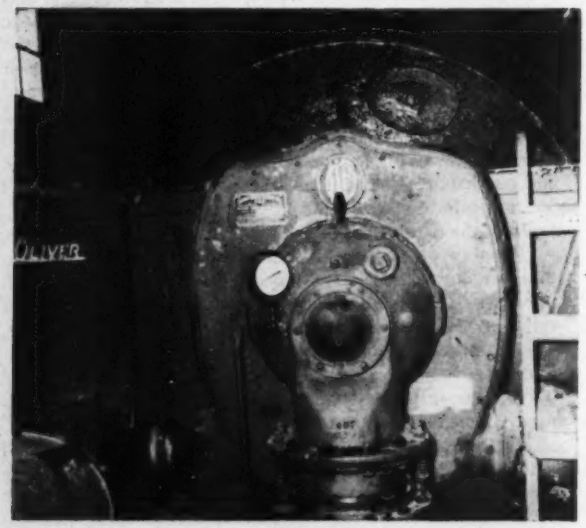
From the dryer, the sheet passes over an eight roll calender stack equipped with a pneumatic loading system and an independent lubrication system. A uniform speed reel with pneumatic adjustable loading mechanism, using Hanna air cylinders, is employed to reel up the paper from the dryers. All roll bearings on the entire paper machine are anti-friction except the king roll in the calender stack. Lodding doctors are installed on the calender rolls, first ten bottom dryers, and breast roll and wire rolls of the fourdrinier.

Machine room and dryers are equipped with an air and ventilating system, furnished by J. O. Ross Engineering Corp. This includes a hood and exhaust system, room heating and ventilating equipment, bottom dryer felt air supply system, calender cooling system, and machine drive



Calender drive unit; G-E sectional drive, Falk reduction gear

One of five V-belt driven Nash pumps for wet end suction



Oliver save-all for paper machine whitewater

motor cooling system. All heating and ventilating fan units are located on the mezzanine floor at the rear of the machine, and are arranged with intakes designed for future addition of air filters to filter all air coming into the mill. Because of the fact that the entire basement of this machine is below grade and has no windows or doors leading to the outside or out to other buildings, a separate heating and ventilating fan unit provides ventilation for the basement. The paper machine hood is constructed of Transite and steel with removable roof panels, so that the dryer bearings may be lifted through access openings using the 20-ton Northern bridge crane which serves the machine room.

A G-E sectional electric drive powers the paper machine. Each section of the paper machine has an individual drive, with its own motor and electronic amplidyne controlled supply generator. The individual generator motors are driven from a single shaft by a G-E 800 hp. steam turbine. Exhaust steam from the turbine at 50 psi is used in the dryers. The seven individual paper machine sections are driven through Falk gear reducers hooked up to the individual motors. The paper machine is equipped with a Mason-Neilan control system. This system controls the steam to the dryers and also controls the pneumatic press loading mechanisms, including the calender and reel.

Reels of paper are transferred to the unwind stand of the Pusey & Jones winder, which has a hydraulic operated roll unloading mechanism and is driven with a G-E variable speed drive.

Dry broke and trim is repulped in a rebuilt Noble and Wood beater, and is pumped back to the machine chest. Liquid alum is stored in a rubber lined tank, while rosin size is prepared in the same system used for the old machine.

Because a considerable portion of the output of the machine is converted into 9-inch diam. counter-rolls, the existing winder will not handle all the output of the machine. Because of this, a new Cameron winder is being installed.

Steam and Power

Electric power for the mill is supplied from the main power plant located about a half mile from the mill. This power plant is all that's left of the sawmill that was dismantled a few years ago. Two new Babcock & Wilcox 50,000 lb. per hr. integral furnace type boilers operating at 175 psi have been added to the steam plant. These are fired with natural gas and are equipped with Hays combustion control, Mason-Neilan feed-water regulators, Warren feed-water pumps, Howard Iron Works feed-water heaters, a Swartout deaerator, and Westinghouse Thermix stacks.

Along with the two new boilers, two Westinghouse 3,000 kw. condensing type turbines have been installed. The main power plant supplies electricity only to the mill.

Process steam for the mill is generated by the B & W recovery furnace previously described, and by the mill steam plant that utilizes bark and wood refuse as fuel. A new B & W 50,000 lb. per hr., 175 psi boiler has been added here. It is equipped with a loop pendant superheater and an ABCO (Acme Brick Co.) dutch oven forced draft furnace and boiler setting. Natural gas can be burned by using three Coppus gas burners. Flue gas discharges through a Thermix stack by means of the induced draft fan driven by a Worthington steam turbine.

Internal treatment only is given the boiler feed water since the water in this area is particularly soft and requires a minimum of treatment.

Future Expansion

Several projects are contemplated to improve and to round out present operations. Among these are a bleach plant, flume type conveyor for the wood yard, additional thickeners for green liquor clarification and dregs washing in the causticizing system and a lime recovery kiln.

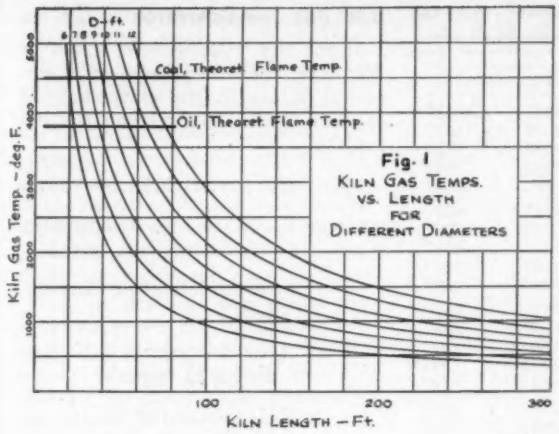


Fig. 1
KILN GAS TEMPS. VS. LENGTH FOR DIFFERENT DIAMETERS

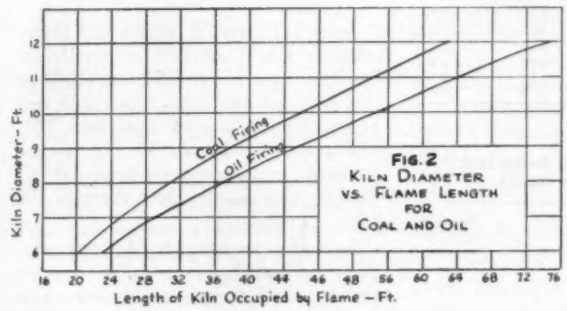


Fig. 2
KILN DIAMETER VS. FLAME LENGTH FOR COAL AND OIL

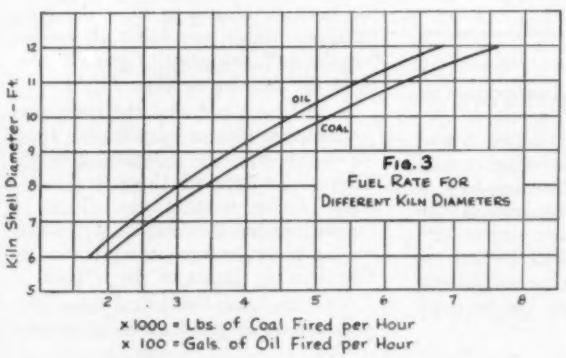


Fig. 3
FUEL RATE FOR DIFFERENT KILN DIAMETERS

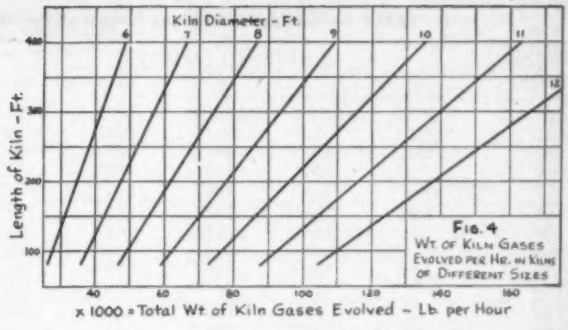


Fig. 4
WT. OF KILN GASES EVOLVED PER HR. IN KILNS OF DIFFERENT SIZES

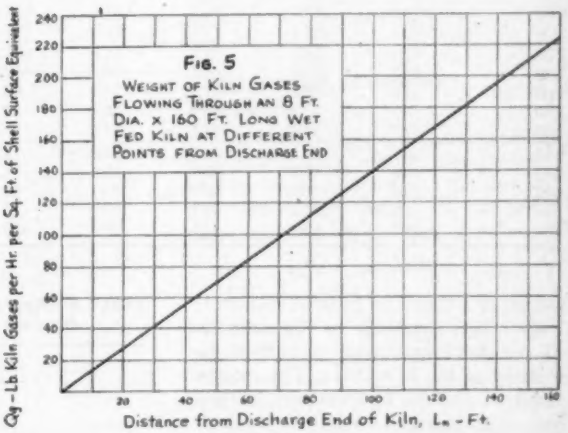


Fig. 5
WEIGHT OF KILN GASES FLOWING THROUGH AN 8 FT. DIA. X 160 FT. LONG WET FED KILN AT DIFFERENT POINTS FROM DISCHARGE END

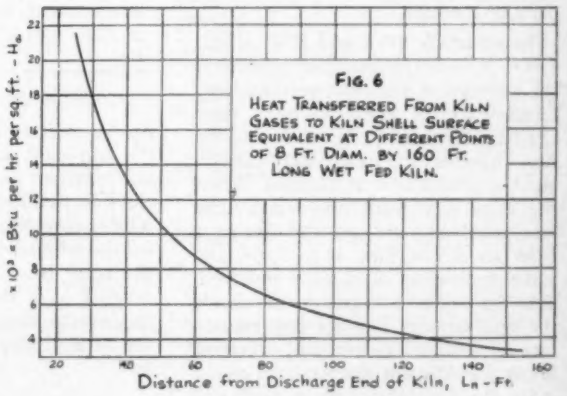


Fig. 6
HEAT TRANSFERRED FROM KILN GASES TO KILN SHELL SURFACE EQUIVALENT AT DIFFERENT POINTS OF 8 FT. DIAM. BY 160 FT. LONG WET FED KILN.

These six graphs illustrate some of the . . .

Fundamentals of lime kiln thermodynamics

RALPH GIBBS
Consulting Chemical Engineer

▶▶▶ IN A PREVIOUS ARTICLE (THE PAPER INDUSTRY, April, 1950, pp 54-62) it was shown that the over-all heat transfer rate within the rotary kiln varied with the diameter. And since this rate of heat transfer is extremely important to the economy of the operation, all studies devoted to it are justified.

We had to look to practice for the data to derive the over-all rate of heat transfer. At the present time there are no real experimental data available to guide us in this study. No doubt such data do exist, but so far as the writer is aware, none of these have been published. So, in the absence of anything better, we must continue to use the empirical relations derived from practice in our further studies of this interesting phenomenon.

The over-all heat transfer rates so far developed are averages, and these do not tell us anything about what might be happening in the different parts or zones of the kiln. Thus, a detailed study of this sort may reveal some interesting features that would help to guide us in kiln design, or in giving us a better understanding of why these kilns perform the way they do. And such a study might enable us to determine the most economical

TABLE 1—Computed kiln gas temperature—deg. F.

Length (feet)	Diameter (in feet)						
	6	7	8	9	10	11	12
10	8487	10937	13767	16872	20200	24017	28470
20	4287	5517	6927	8487	10100	12009	14087
30	2887	3707	4647	5687	6827	8057	9387
40	2187	2807	3507	4287	5137	6087	7087
50	1767	2257	2827	3447	4137	4867	5587
60	1487	1897	2367	2887	3457	4047	4737
70	1287	1647	2047	2487	2967	3507	4087
80	1137	1447	1797	2187	2607	3077	3587
90	1027	1297	1607	1957	2327	2767	3197
100	927	1177	1457	1747	2107	2487	2887
120	787	997	1227	1487	1767	2077	2417
140	687	867	1067	1287	1527	1797	2087
160	617	767	947	1137	1347	1587	1837
180	554	692	847	1017	1207	1417	1642
200	507	632	770	927	1097	1282	1487
220	470	582	707	852	1007	1177	1357
240	437	539	657	787	927	1087	1252
260	410	504	612	732	867	1007	1162
280	387	475	575	687	807	947	1087
300	367	449	542	647	762	887	1022
320	349	426	514	612	717	837	962
340	334	407	489	581	687	792	912
360	320	388	467	554	647	752	867
380	308	372	447	529	617	717	822
400	297	358	429	507	592	684	787

length of a lime kiln of fixed diameter.

Our best approach to the solution of our problem can be made through a study of the kiln gases. The masses involved and the temperatures as they vary throughout the length of the kiln can be used to show us something about the heat transfer rate in the different parts of the kiln.

In an article (P.I. and P.W., Dec., 1949) it was explained and shown that the quantity of heat, the sensible heat, received by, or given up by, a mass can be measured by the product of the mass involved, the temperature change, and the specific heat of the mass. When the mass is flowing, there is a time rate involved, and we can derive a time-rate of heat flow. If we know also some equivalent of surface involved, then we will be in a position to derive the heat transfer rate per unit equivalent of surface. To do this, we must know the different temperatures of the mass, the weight rate of its flow, and the square feet equivalent of the basic heat transfer surfaces involved. This is not an easy task, but it can be done.

It will be noted that the term equivalent is used when the heat transfer surface is spoken of. No attempt is made to base the computations on the actual surfaces involved in transfering the heat from the flame or hot gases to the load and walls of the kiln. Although this could be done, after a fashion, it would be no end complicated, and the final results would be no more valid than the results achieved by using the simpler method with the surface equivalent. And for our use, the surface equivalent will be the surface of the kiln shell. In other words, the actual heat transfer surfaces involved in the process will be in some proportion to the kiln shell surface. The use of special devices or arrangements within the kiln to affect the exchange of heat will change this ratio as compared to a kiln without such contrivances. On the other hand any other size of kiln holding such devices will be affected in a similar manner. So the simplifying use of equivalent surface can be justified.

TABLE 2—Approximate flame lengths for coal and oil (feet)

Dia.	Coal	Bunker C oil
6	20	23
7	25	29
8	31	37
9	38	45
10	46	55
11	54	64
12	63	75

Kiln gas temperatures

In the May, 1946, issue of *Chem. & Met. Eng.*, the writer presented an emperical relation for the temperatures of the kiln gases. This relation has the form:

$$T_{gw} = (4700 + 1550D/R_k) + 287 - 200R_f$$

wherein T_{gw} is the gas temperature, °F. for the wet feed kiln

D is the kiln shell diameter, feet

R_k is the ratio of kiln shell length to diameter

R_f is the ratio of the percentage of water in the feed to the percentage of solids in the feed

Since the time at which the above relation was presented originally, it has been found to be of more use than simply to predict some reasonable and practical exit kiln gas temperature. This will be shown later. At this time we are primarily interested in the temperatures of the gases as they flow through the kiln.

In order to simplify the computations for developing a table to show the above relation, a reasonable value for R_f will be assumed. This will be taken as 1.0 signifying that the feed holds 50 per cent of water. Table 1 has been developed to show the temperatures within the kilns of various lengths and diameters. Figure 1 presents the data pictorially.

It will be noted that the computed gas temperatures for short lengths from the firing end are rediculously high. They go far above the theoretical maximum flame temperatures. This of course is impossible. But it may be that we can put an unique interpretation to this peculiar feature of the relation.

The maximum theoretical flame temperature for a good grade of bitumi-

TABLE 3—Weight of kiln gases per hr. for kilns of various sizes

Length (feet)	Diameter (in feet)						
	6	7	8	9	10	11	12
80	26200	35600	46500	58900	72800	88000	104800
100	27600	37500	49000	62000	76700	92800	110300
120	29000	39500	51600	65200	80600	97500	116000
140	30400	41400	54000	68500	84500	102200	121700
160	31800	43200	56500	71500	88400	107000	127000
180	33200	45200	59000	74800	92300	111700	133000
200	34600	47100	61500	77800	96200	116200	138500
220	36000	49000	64000	81000	100000	121000	144000
240	37400	51000	66600	84300	104000	126000	150000
260	38800	52900	69000	87400	107900	130700	155300
280	40300	54800	71500	90500	111800	135200	161000
300	41600	56600	74000	93600	115700	140000	166500
320	43000	58600	76500	96800	119600	145000	172000
340	44500	60500	79000	100000	123500	149500	178000
360	45900	62400	81500	103000	127400	154000	183000
380	47200	64200	84000	106000	131300	159000	189000
400	48600	66300	86500	109500	135200	163800	195000

nous coal is about 4500 F., and for Bunker C. (No. 6) oil it is about 3800 F. Under ordinary conditions, and without preheating the air for combustion, these theoretical flame temperatures cannot be exceeded. But we can assume, quite reasonably, and further corroborated by practical conditions, that *the length of the kiln wherein the computed temperatures are above the theoretical maximum will be that length occupied by the flame.*

Thus, by drawing lines across the family of curves at the maximum theoretical flame temperatures for specific fuels, the average length of kiln occupied by the flame can be reasonably established.

Flame lengths as so approximated for the various kiln diameters when using coal or oil as fuel are shown in Table 2 and Figure 2.

Combustion gases

The weight of combustion gases formed, all other conditions remaining the same, is a function of the kiln diameter. This will be understood when it is recalled that combustion in rotary kilns is a volume phenomenon, and that conditions for combustion are similar when velocities are alike. Thus the cross-sectional area of the kiln will largely govern the quantity of fuel that can be burned properly.

It has been found to be good practice to burn such a quantity of fuel as to develop about 900,000 Btu per hr per sq. ft. of kiln shell cross section area. For coal of 13,500 Btu per lb. heating value, this is equivalent to about 67 pounds of coal per hour per square foot of kiln shell cross sectional area. For bunker C oil, the equivalent quantity is about 6.0 gallons per hour per square foot of kiln shell cross sectional area.

Thus, $(\pi\ D^2/4)x67 = 52.5\ D^2$

is the optimum fuel rate in pounds per hour for coal, and

$(\pi\ D^2/4)x6.0 = 4.7\ D^2$

is the optimum fuel rate in gallons per hour for Bunker C (No. 6) oil.

The fuel rates for the different kilns diameters is shown in Figure 3.

Thus the weight of combustion gases for coal, assuming balanced combustion conditions, will be:

$52.5\ D^2 x 10.94 = 572\ D^2$ lb. per hr.

and for oil

$4.7\ D^2 x 122 = 572\ D^2$ lb. per hr.

and the same relation can be used either for oil or coal.

In the flame zone, the gases are predominantly those of combustion.

TABLE 4—Pounds kiln gases per hr. per sq. ft. of shell surface equivalent

L_n	L_{n-s}	Q_g
L (160 ft.)	150	217
150	140	203
140	130	189
130	120	175
120	110	161
110	100	147
100	90	133
90	80	119
80	70	105
70	60	91
60	50	77
50	40	63
40	30	49
30	20	35
20	10	21
10	0	7

Gas from mineral

In order to have some reasonable idea of the quantity of gas involved during a normal operation of the kiln, we must resort to the optimum kiln production relation to get the gas evolved from the mineral. This relation is:

$T_d = kd^2L/100$

wherein T_d is the tons of product per day

k is the production coefficient, generally 1.0

D and L are the diameter and length of the kiln shell in feet

The hourly production rate will be:

$T_h = 1.0\ D^2L/(24x100)$

In an earlier article it was pointed out that in producting each ton of lime there is evolved approximately 1340 pounds of carbon dioxide. Then:

$W_{gm} = (.01xD^2x1340)/24 = 0.56D^2L$

wherein W_{gm} is the optimum pounds of mineral gas evolved per hour.

Water Vapor

With 50 per cent of water in the kiln feed, each pound of lime produced requires the evaporation of 1.67 pounds of water, or:

$W_{gw} = (0.01D^2L/24)x3340 = 1.39D^2L$

For the purpose of simplifying our problem, it will be assumed that the weight of gas flowing within the kiln increases uniformly between the firing end and the feed end. Gas or vapor is being evolved from the load or charge in almost every foot of the kilns length, and no great error will be imposed if we postulate uniform evolution.

Total weight of flowing kiln gases

The total weight of gases evolved within the kiln will be, for 50 per cent of water in the feed, the sum of the combustion gases, the mineral gases, and the water vapor.

$W_{gt} = 572\ D^2 + .56\ D^2L + 1.39\ D^2L = D^2(572 + 1.95\ L)$

wherein W_{gt} is the total pounds of gas handled by the kiln per hour.

Table 3 and Figure 4 illustrate the relation given.

Since it has been assumed that the evolution of the gases throughout the kiln is uniform and constant, the weight of gases passing any section at a distance L_n from the discharge end of the kiln will be:

$W_{gn} = D^2\ (572 + 1.95L)\ (L_n/L)$

The average weight of gases passing through a section of the kiln between L_n and L will be:

$[(W_{gt} - W_{gt}\ L_n/L)/2] + W_{gt}\ L_n/L$

and by simplifying

$(W_{gt}/2)\ (1 + L_n/L)$

The average weight of gases passing through any section of the kiln between the points L_{n-s} and L_n will be:

TABLE 5—H_2 = BTU transferred per hr. per sq. ft. from the kiln gases to the equivalent kiln shell surface

L_n	L_{n-s}	Q_g	ΔT	H_s
L (160 ft.)	150	217	57	3330
150	140	203	65	3560
140	130	189	75	3820
130	120	175	88	4150
120	110	161	104	4520
110	100	147	124	4920
100	90	133	152	5450
90	80	119	190	6100
80	70	105	244	6930
70	60	91	326	8000
60	50	77	456	9480
50	40	63	685	11650
40	30	49	1140	15100
30	20	35	2280	21600
20	10	——	——	——
10	0	——	——	——

$$[(W_{gt}L_n/L - W_{gt}L_{n-a}/L)/2] + W_{gt}L_{n-a}/L$$

or

$$(W_{gt}/2)\,[(L_n + L_{n-a})/L]$$

wherein $L_{n-a} < L_n < L$

Thus the following relation gives the average weight of gases, in terms of the kiln's physical dimensions, passing through a length of the kiln between the points L_{n-a} and L_n measured from the discharge end of the kiln.

$$[D^2(572+1.95L)/2]\,[(L_n+L_{n-a})/L]$$

The kiln shell surface equivalent of the heat transfer surfaces for the same length of kiln between L_{n-a} and L_n will be:

$$3.14\ D\ (L_n - L_{n-a})$$

so that the average weight of gases flowing per square foot of kiln shell surface equivalent will be:

$$D^2\,(572+1.95L)\,(L_n+L_{n-a})/6.28\ L\ D\ (L_n-L_{n-a}) = 0.159\ D\ (572+1.95L)\ (L_n+L_{n-a})/L\ (L_n-L_{n-a})$$

As a specific example, Table 4 and Figure 5 illustrate the relation above. A kiln 8 ft. diameter by 160 ft. long has been used.

Heat transferred from kiln gases

Knowing the weights of gases that are passing through the kiln and knowing these temperatures of these gases at the various points in the kiln, it is possible to compute the quantity of heat transferred to the kiln surfaces by the gases beyond the flame zone.

The drop in gas temperature as the gases travel through a section of the kiln represents the delivery of a certain amount of heat. And when the area of the surface traversed is known, the heat transfer rate per square foot of surface can be derived.

The following relation can be used for this computation.

H_a = (lb. gas per hr. per sq. ft.) (ΔT) (Sp. Ht.)

wherein H_a is the Btu per hr. per sq. ft. kiln shell surface equivalent.
ΔT is the temperature difference of the gases flowing through a kiln section.

The specific heat of the gases will be assumed as 0.27.

The above relation will be arranged to carry the elements as they have been derived. Thus

$$Q_s = 0.159D\ (527+1.95L)\ (L_n+L_{n-a})/L\ (L_n-L_{n-a})$$

The kiln gas temperature relation can be used to determine ΔT as follows:

$$T_{gw} = (4700+1550D/R_{x1}) + 287 - 200R_f$$

wherein R_f is 1.0 (50 per cent water in the feed)

R_{x1} will be L_{n-a}/D

and

$$(4700+1550D/R_{x2}) + 287 - 200R_f$$

Wherein

R_{x2} is L_n/D

Then

$$\Delta T = [(4700+1550D)/L_{n-a}/D] + 87 = [(4700+1550D)L_n/D] + 87 = (4700+1550D)\ (L_n - L_{n-a})D/(L_{n-a})\ (L_n)$$

Thus

$$H_a = [0.159D\ (572+1.95L)\ (L_n+L_{n-a})/L\ (L_n-L_{n-a})]\ [(4700+1550D)\ (L_n-L_{n-a})D/(L_{n-a})\ (L_n)]\ 0.27$$

Continuing with the kiln used in the previous example, 8 ft. dia. by 160 ft. long, Table 5 has been computed from the above relation. Figure 6, shows the results.

Thus it is seen that the heat transfer rate is considerably higher in the hot zones of the kiln than it is in the cooler zones.

In computing the over-all heat transfer rate from the optimum production rate for this kiln, the result will be about 8600 Btu per hr. per sq. ft. equivalent.

The value of this study is not only in its revelation of the manner in which the heat transfer rate is distributed throughout the kiln, but that some of these relations may be used to determine the most economical kiln length.

Legal decisions can help shape management policies

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▶▶▶ ALL MANUFACTURERS, sellers, users and purchasers of paper and pulpwood should become familiar with new and important recent higher court decisions involving the industry. This is so because recently the higher courts in different localities have rendered many outstanding decisions, each of which involves some distinctive feature of peculiar law. Quite obviously, knowledge of these modern decisions will enable readers to avoid expensive litigations. All these new cases may be advantageously utilized to win favorable verdicts in unavoidable law suits.

Patent belongs to employer

Considerable discussion has arisen from time to time over the legal question: When does an employee own a patent on an invention he patented? According to a recent higher court where any person, as a chemist, is employed to devise, perfect or invent, or a means for accomplishing a prescribed result with paper he cannot, after successfully accomplishing the work for which he was employed, file an application for a patent in his own name. In other words, whatever rights as an individual he may have had in his inventive powers he has sold in advance to his employer, who paid for his time, work, and effort.

For example, in Marcalus Manufacturing Co., Inc. v. Sullivan, 60 Atl. (2d) 330, the testimony showed facts, as follows: The Marcalus Manufacturing Co. is engaged in the business of manufacturing paper products such as napkins, handkerchiefs, waxed paper and the like. The officials of the company became interested in the possibility of producing a paper which would have the appearance and softness of textiles and which could be used for draperies. It was essential to the success of such a product that it should be soft, flameproof, and have no offensive odor or discoloration. And it was also important that the effect of moisture upon the paper should be confined within narrow limits.

The Marcalus Manufacturing Co. employed a regular chemist but since he was busy with the general chemical problems of the company, it was decided that an outside chemist should be hired who could devote his time to the discovery and development of a process for paper draperies which would accomplish the desired result at a cost that would make possible commercial production.

The president of the Marcalus Manufacturing Co. contacted a chemist named Sullivan and explained what he desired. Sullivan worked for a large food concern and had had no previous experience with the processing of paper, but he was anxious to tackle the task in his spare time. It was agreed that Sullivan should receive $5.00 an hour for the time spent upon the problem. He was offered the facilities of the Marcalus Manufacturing Co. plant but felt that he could

work conveniently in his own laboratory. It was arranged that Sullivan should report upon his progress from time to time.

Sullivan started to work for the Marcalus Manufacturing Co. and continued working upon the problem for eleven months. He rendered reports of his progress from time to time and submitted samples of paper.

Sullivan did not report for some time and Marcalus testified that he called Sullivan to inquire about the progress being made. Sullivan informed Marcalus that he had perfected a formula which, he felt, accomplished the desired results but that he had invented it on his own time. Later Sullivan arranged to go to the plant with a sample of the paper produced. Marcalus, upon being shown the sample, agreed with Sullivan that it met the specifications. When Marcalus asked for the formula, Sullivan said that it was so good he wished to take steps himself to protect it. Finally Marcalus told Sullivan that a run of paper using the new formula would be made and if the result was successful, the company would give Sullivan a bonus of $5,000 and find a place for him in its organization. Sullivan insisted on ordering the chemicals himself and they were sent to the plant in unmarked containers. Sullivan mixed the chemicals, made the run and the result was successful. Marcalus then asked for the formula. He told Sullivan that he would like to arrange for the preparation of a patent application. Sullivan objected, and explained to Marcalus that he had not perfected the invention during the time he was paid $5.00 an hour by the Marcalus Manufacturing Co. Sullivan maintained that he had perfected the process on his own time and that he had not at any time experimented on it while being paid by the Marcalus Manufacturing Co. Notwithstanding this testimony, the higher court ordered Sullivan to assign the invention to the Marcalus Manufacturing Co. and said:

"Sullivan attempted to justify his refusal to turn over the formula by stating that it was discovered when he was not working for Marcalus . . . . Sullivan also testified that the final formula was in no way related to the research he had been doing throughout the year. He insisted that his work for Marcalus had been of no value to him in reaching the ultimate result . . . . Sullivan's testimony is not convincing."

Hence, in this case the higher court decided that the Marcalus Manufacturing Co. owned the patented process because Sullivan perfected it while being paid by the Marcalus Manufacturing Co. Quite obviously the decision would have been otherwise if the court had decided that Sullivan perfected the patented process on his own time while *not* being paid by the Marcalus Manufacturing Co.

In order to avoid similar litigations, employers should include in contracts of employment a clause to the effect that the employee will assign to the employer *all inventions and patents conceived, devised and obtained during the full period of the employment.*

No unemployment compensation

Recently a higher court refused to award compensation under the State Unemployment Compensation Act to employees who refused to go through a picket line to their work in a paper mill.

For example, in Aitken v. Board of Review of Unemployment Compensation Commission, 56 Atl. (2d) 587, it was shown that certain employees of the Hinde and Dauch Paper Co. did not work because a picket line had been established by another union and this they would not cross.

The State Board held that the voluntary refusal of the employees to cross the picket line amounted to participation in a labor dispute at the place of employment, and for that reason they were disqualified from receiving unemployment compensation under the State Unemployment Compensation Act.

Negligence assumed

According to a recent higher court, negligence of a truck driver will be presumed when the testimony shows that a load is insecurely fastened onto the truck and the truck driver is otherwise negligent.

For example, in Southern Advance Bag & Paper Co., Inc. v. Jones, 43 So. (2d) 690, it was shown that a motor truck loaded with pulpwood suddenly topped a hill. At this time a passenger automobile also topped the hill. The testimony showed that the truck driver was driving the truck without proper brakes, and without the load of wood being chained. Also, the truck driver slowed down and jumped from the truck, permitting it to continue uncontrolled down the center of the road.

As the truck moved past the passenger car, the front of the car was pulled along the left side of the truck and the greater portion of the load of pulpwood fell from the truck. Some of the pieces crashed through the cloth top of the passenger car and caused substantial injury to its driver who sued the Southern Advance Bag and Paper Co., owner of the truck, for damages. In holding the latter liable, the higher court said:

"The testimony showed that the truck was not under control and on its own side of the road when the collision occurred. The fact that he (driver) saw fit to abandon the moving truck is a further indication that they considered the vehicle to be out of control."

Independent contractor

All higher courts agree that an employer need not pay compensation insurance under either the State Workmen's Compensation Act or the State Unemployment Compensation Act on an independent contractor. And an employer need not pay other taxes such as Social Security, on an independent contractor. And, again, an employer is not liable in damages for injuries effected or caused persons or property by an independent contractor. Hence, for these reasons, it is important for all employers to have at hand a dependable rule to determine whether or not an employee is an independent contractor.

For example, in Deason v. Operators Casualty Co., 43 So. (2d) 630, it was shown that an employee named Deason was employed to furnish his own truck, or trucks, and equipment for cutting and hauling pulpwood, paying his own employees, doing some work himself, and received $8.90 per cord of wood cut, hauled and delivered. While engaged in these pulpwood operations Deason sustained accidental injuries resulting in his total and permanent disability.

These questions were presented the higher court: Is Deason an independent contractor? If not, can he receive compensation from the State Workmen's Compensation Act? If he is an independent contractor can he receive any compensation? It is interesting to observe that the higher court held that Deason is not an independent contractor, and awarded compensation under State Workmen's Compensation Act. The court said:

"The essential criterion seems to be found in the ability of the employer to terminate the work at will. Any employee cannot deem to be independent when his work can be stopped at the will of the employer, because the power to terminate the employment gives to the employer the power to control the activities of the employee."

For comparison, see Murphy v. Tremont Co., 22 So. (2d) 79. Here the testimony showed that Murphy entered into a written contract with a company to cut and haul to a specified loading track all of the timber of certain species. The contract, in considerable detail, set forth the rights of both parties, providing for a date of beginning work and a final time limit for the completion of the work. In other words, the employer could not dis-

charge Murphy until the term of the written contract expired. Therefore, the higher court held that Murphy *is a legal employee* and not an independent contractor. This court said:

"Neither party had the right to terminate the work except upon completion of the entire work contracted for. It follows, accordingly, that defendant (employer) had no control or supervision over plaintiff's (employee's) activities."

Not useless

The state compensation laws are *strictly* construed.

For example, in Walsh v. C. J. Fox Co., 70 Atl. (2d) 37, a state law was litigated which specifies compensation allowable when the testimony shows that an injured employee's hand is "useless."

Here it was shown that an employee, while operating a paper-cutting machine, lost by severance four fingers and the greater portion of the palm of his right hand. His thumb and wrist, however, were uninjured.

The employee sued to recover compensation under the State Workmen's Compensation Act based on "total incapacity."

The testimony showed that for a long time after the accident his right hand was immobilized which was the cause in part of a limitation of motion in his thumb and wrist. However, now the joint at the base of the thumb, where it joins the wrist, is almost normal so that it can be moved forward and backward and around. In view of this evidence, the higher court refused to award compensation and said that under the circumstance the employee's hand is not "useless"; and since state compensation laws are strictly construed no compensation is allowable.

Can use own name

According to a recent higher court, a person can use his own name without being guilty of unfair competition although the adopted name is similar to the name of a well-known and long established firm.

For example, in Osborn Paper Co. v. Carrold Osborn Paper Co., Inc., 226 S. W. (2d) 408, it was shown that the Osborn Paper Co. had been established in the paper business for many years. Later a man named Carrold Osborn incorporated a corporation under the name of Carrold Osborn Paper Co., Inc., near the location of the Osborn Paper Co. The latter filed suit against the Carrold Osborn Paper Co., Inc., and asked the court to award damages on the ground of "unfair competition." The higher court refused to hold the Carrold Osborn Paper Co., Inc. liable, and said:

"The right of a man to use his name is almost inviolate, unless it is shown beyond any question that it (his name) is used for an ulterior motive. The most that the petition alleges is that respondent is engaged in the business of selling the same products under its corporate name of 'Carrold Osborn Paper Co.' "

Income tax overpayment

According to a recent higher court, if a taxpayer through mistake pays more income tax than he owes, he cannot recover the overpayment from the Government unless he files a claim within three years, but the Government has four years to sue and collect an underpayment from a taxpayer.

For example, in Honolulu Paper Co. v. Kanne, 76 F. Supp. 790, the higher court refused to allow the Honolulu Paper Co. any credit for overpayment of United States income taxes because the company delayed more than three years after it filed the return and by mistake paid more money to the Collector of Internal Revenue than was due under the law.

The higher court held valid a United States statute which provides that unless a claim for credit or refund of income taxes is filed by the taxpayer within three years from the time the return was filed by the taxpayer, or within two years from the time the tax was paid, no credit or refund shall be allowed.

Also, see Kavanagh v. Noble, 332 U.S. 535. Here the United States Supreme Court held that although a taxpayer cannot recover any overpayment of income taxes unless the claim is filed within three years after the taxpayer filed his tax return, the Government has four years in which to sue a taxpayer for overdue tax not collected through error on the part of the Collector of Internal Revenue.

Bankrupt returns paper

Considerable discussion has arisen from time to time over the legal question: Under what circumstances may a seller take back merchandise from a bankrupt or insolvent purchaser? The answer is: A seller may take possession of merchandise sold and delivered to a bankrupt purchaser when the testimony shows that at the time the goods were repossessed the seller had good cause to believe that the purchaser was solvent. According to a recent higher court, a report from Dun and Bradstreet that a purchaser is solvent is good evidence in favor of the seller.

For example, in Levy v. Carter Rice and Co., 70 Atl. (2d) 148, a section of the Bankruptcy Act was litigated which provides that a "preference" is voidable if the creditor who receives merchandise from the bankrupt has "reasonable cause to believe that the debtor is insolvent."

In this case the testimony showed that about thirty tons of paper were shipped to a purchaser named Bochan by Carter Rice and Co. in March, 1947, on thirty days credit. On April 23 the seller secured a confidential report from Dun and Bradstreet which showed Bochan to be in good financial condition. No payments were made until the latter part of April, when the seller received $1,000. In May the seller sent its representatives to call on Bochan. The prospects were discussed and an extension of time granted. No payments were made before the period of extension expired and, after several communications by letter and telephone, representatives of the seller called on Bochan on June 10. The latter stated that the debt could not be paid in full and that the best he could say was that his prospects for business would perhaps improve. It was finally decided that the March shipment would be returned to the seller for credit and that Bochan would give the seller two checks for $500 each to apply on shipments received prior to March.

Bochan was insolvent on June 10. This information was made known in the subsequent trial, but on June 10 when Bochan agreed to return the March shipment of paper the testimony showed that the seller did not know that Bochan was insolvent.

Later, Bochan was adjudged a bankrupt and the trustee in Bochan's bankruptcy filed suit against the seller to recover possession of the March shipment of paper returned by Bochan. The trustee contended that the seller had "reasonable" cause to believe that Bochan was insolvent on June 10, the date the latter agreed to return the March shipment of paper to the seller.

It is interesting to observe that the higher court held that the trustee in Bochan's bankruptcy could not take possession of the paper as an asset for distribution among all of Bochan's creditors because the seller had relied upon the Dun and Bradstreet report which stated that Bochan was in good financial condition. The higher court said:

"The defendant (seller) did not know or have reasonable cause to believe that Bochan was insolvent at the time the transfer was made. . . . A Dun and Bradstreet report on Bochan, dated April 23, was . . . admitted by the trial court . . . to show the good faith of the defendant (seller) in this case in gaining knowledge of the condition which you claim that he should know about as a reasonable person. This was permissible."

Centrifugal pumps . . .

mechanical stuffing box seals

Part 8 of a series dealing with centrifugal pump design, operation and maintenance.

IGOR J. KARASSIK and ROY CARTER
Application Engineers
Worthington Pump & Machinery Corporation

Fig. 1—Mechanical seal (Durametallic Corp.) in lower half casing of horizontally-split pump

▶▶▶ THERE ARE MANY conditions of service met in the field where the conventional stuffing box design and composition packing are impractical to use as a method for sealing a rotating shaft. In the ordinary stuffing box, the sealing between the moving shaft or shaft sleeve and the stationary portion of the box is accomplished by means of rings of packing forced between the two surfaces and held tightly in place by a stuffing box gland. The leakage around the shaft is controlled by merely tightening up or loosening the gland studs. The actual sealing surfaces which move relatively to each other are the axial surfaces of the shaft or shaft sleeve and the packing.

When an attempt is made to reduce or eliminate all leakage through a conventional stuffing box, the gland pressure is increased. The packing, being semi-plastic in nature, forms more closely to the shaft and tends to cut down the leakage. After a certain point, however, regardless of how tightly the gland studs are brought up, the leakage continues. The frictional horsepower increases rapidly at this point, the heat generated cannot be properly dissipated and the stuffing box fails to function.

These undesirable characteristics eliminate the use of packing as the sealing medium between rotating surfaces if the leakage is to be held to an absolute minimum under severe pressure conditions. This, in turn, automatically eliminates the axial surfaces as the sealing surfaces, since a semi-plastic packing is the only material which can be made to always form about the shaft, compensating for the wear. With these facts in mind, mechanical seal designers have had to attempt an entirely different type of seal using wearing surfaces other than the axial surfaces of the shaft and of the packing.

The following discussion treats of the more general characteristics of several of the most successful types of mechanical seals. It should be borne in mind, however, that as every pumping problem is different, so is every sealing problem, and when positive and dependable results are desired, the mechanical seal should be specially designed and fitted to the particular unit in question.

The objects of a mechanical seal are to afford a positive leak-proof seal for a wide range of fluids such as corrosive acids and gritty, contaminated or inflammable liquids and to develop in so doing a minimum of frictional resistance and consequent power loss. All mechanical seals, while they differ in various physical respects, are fundamentally the same in principle. In each one, the sealing surfaces are located in a plane perpendicular to the shaft and usually consist of two polished surfaces running adjacently, one surface being connected to the shaft and the other to the stationary portion of the pump. Complete sealing is accomplished at the fixed members. The polished or lapped surfaces are of dissimilar materials and are held in continual contact by a special spring arrangement. They form a fluid tight seal between rotating and stationary members with small frictional losses. When new, the leakage past a mechanical seal is so small as to be negligible and could be considered as non-existent. Of course, some wear always occurs and provision must be made for a very small amount of leakage. The operation of a seal can best be understood by reference to a few standard commercial units.

Dura-Seal

A typical application of a single Dura-Seal is shown in Figure 1 installed in the lower half of a horizontally split casing pump. The construction of the seal itself is illustrated on Figure 2. The gland with the gland insert is fitted into the casing and is the stationary member of the seal assembly. It provides a seal at two points: first, by means of the gaskets between it and the face of the stuffing box and second through its contact with the seal ring face. The mating seal ring with a hardened steel surface rotates with the shaft and is held against the stationary member by the compression ring. The latter supports a nest of springs which are connected at the opposite end to the collar which in turn is fixed to the shaft. The seal ring is fitted with packing which prevents all leakage between the seal ring and the shaft. It is essential in such a seal that one face be flexibly mounted so as to keep the surfaces in full contact, regardless of any shaft deflection. The springs and an ample clearance between the shaft and the seal ring proper accomplish this in this unit. At the same time, the collar keeps all the other rotating members of the seal in proper position.

The gland insert which is in contact with the seal ring is made of anti-frictional material. It can, when necessary, be designed for lubrication.

Two Dura-Seals may be mounted inside a stuffing box to make a double seal assembly. Such an arrangement is frequently used for sealing centrifugal pumps handling propane, butane, naptha and other light hydrocarbons. In such applications, high pressure cooling and flushing oil is circulated between the two seals. This double seal is also used when the pump handles a gritty liquid, flushing liquid being supplied between the two seals at a pressure higher than at the interior of the pump adjacent to the first seal.

John Crane Seal

A spring loaded synthetic rubber bellows is manufactured by Crane Packing

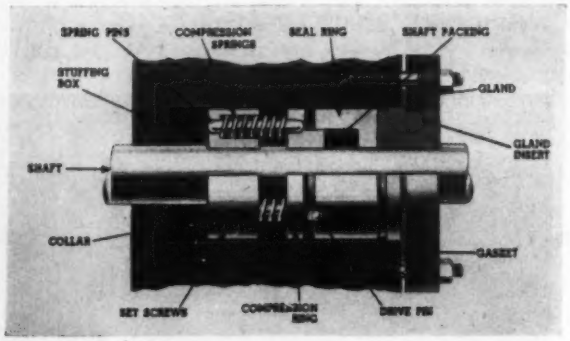


Fig. 2—Details of Dura-Seal shown in Fig. 1

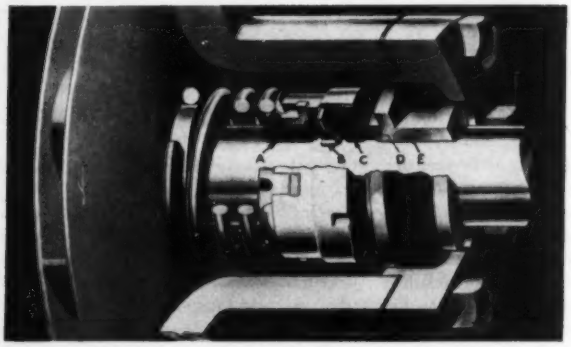


Fig. 3—John Crane mechanical seal

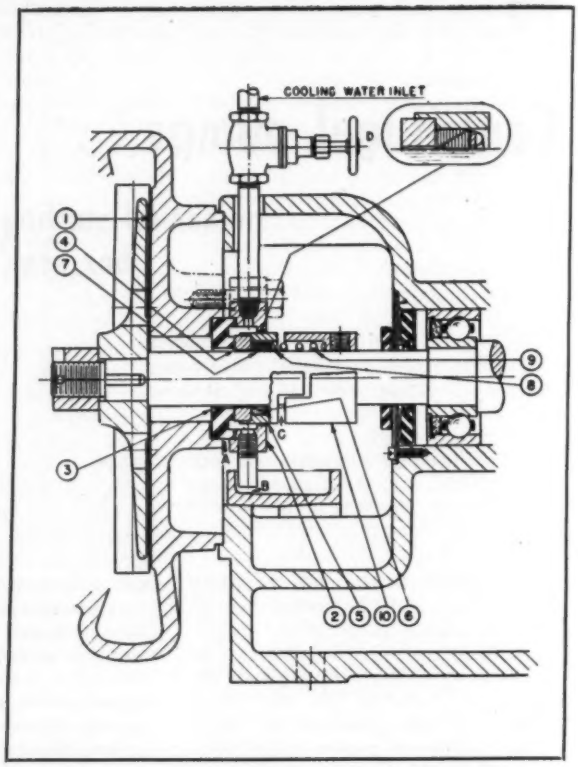


Fig. 4—Worthington mechanical seal for chemical pumps

Co., which recommends it for use with mechanical seal designs. Figure 3 illustrates a typical construction and installation of the John Crane shaft seal. The tail of the synthetic rubber bellows (A) seals on the shaft; the head is flexible and adjusts automatically for washer wear and shaft end play. Protective ferrule (B) prevents the flexing area of the bellows from sticking to the shaft. Sealing washer (C) has a positive drive through metal parts and seals against the stationary floating seat (E). The two sealing faces (D) are lapped at the factory and provide a seal against all leakage.

Worthington Mechanical Seal

This seal has proved extremely satisfactory on chemical service under the following conditions:

1. Where an independent water seal on a packed stuffing box cannot be used, due to:

(a) Incompatibility of traces of water with liquid pumped, such as with sensitive reaction products including crystallization, separation and vinegar generation; also battery acid (dilution during shut-down) and remote control pumping.

(b) Water not available.

(c) Process limitations, such as heat of dilution with concentrated sulphuric acid (70-98%); anhydrous products, acetic anhydride, and acid-solvent mixtures.

(d) Inadequate or inexpert attention with possible costly hazard or maintenance.

2. Where other fluid or grease seals on a packed stuffing box cannot be effectively used.

3. Where it is impractical to operate pump with regulated (negative) pressure at stuffing box.

4. When liquid to be pumped attacks all known packing.

5. Where there is possibility of abrasive solids impregnating packing, such as slurry pumping.

This seal is illustrated on Figure 4 and is made up of the following elements:

(a) Stator member is a simple ring or bushing (3) fitting into a loose recess in pump casing (1). It is bolted to the casing with Worthite (stainless alloy) bolts, against a corrosion resisting gasket (same material as between pump casing and suction head). It is, therefore, simple to remove for relapping or replacement. Note this bushing is grooved to prevent recessing of rotor face into a worn surface.

(b) Clamp (2) for bolting bushing to casing is hollow to provide a channel for cooling water. (Mating faces of seal last longer if kept cool).

(c) Seal ring body and insert (4, 5). Body is of Worthite with replaceable insert for the wearing face. Materials are used for the insert that are corrosion resistant and having physical properties to resist wear when rotating at high speed against the bushing. (4000 hours have been recorded with one set of mating faces in a sulfuric acid-nitric acid mixture.)

Both mating faces are made and applied with precision accuracy, so little, if any, "running-in" period is required for perfect sealing.

(d) Shaft seal (6, 7) is permanently accomplished by using inert "Teflon" plastic rings. These are so made to take up against the shaft and seal ring body with the adjustable spring.

(e) Back-up ring and spring (10, 9). These parts are Worthite. The single coil spring is sturdy and should outlast the pump itself. The back-up ring or drive collar engages the seal ring body by tongue and groove drive with ample overlap. It provides flexibility without interfering with accuracy. Spring is housed so it cannot loosen or get out of engagement. Worthite screw driver slotted set screws lock the back-up ring at proper place on shaft to provide correct spring pressure to hold seal faces together under varying pump suction pressures.

Paper and paperboard making—VI

HARRY WILLIAMSON

Cylinder Machine Formation Questions . . . Part 1

ELSEWHERE IN THIS SERIES, the author has brought out that whether paper is made by hand mold, by laboratory sheet machine, or by the biggest and fastest running paper machine of *any* type, the FUNDAMENTAL PRINCIPLE of the FORMATION of individual fibers into a sheet of paper *remains the same.*

Question No. 1

How is the formation of a sheet of paper from a mixed volume of fiber and water in contact with a revolving wire mesh effected?

Question No. 2

At what point on the revolving mold does the sheet START TO FORM on the wire mesh?

Question No. 3

How long does actual formation of the sheet continue to take place round the circumference of the revolving mold?

Question No. 4

How *rapidly* does formation take place?

Question No. 5

What governs the SPEED or TIME RATE OF THE FORMATION?

After the answers to the foregoing questions have been studied, we shall be in a better position to discuss the function and position of the baffle boards and circle.

Answer to Question No. 1

Formation Principle Unchanged

Since the first sheet of paper was made (as far as is known that was about 1850 years ago), we have *not* changed the PRINCIPLE; we have only devised mechanical means to produce a CONTINUOUS sheet of thousands of square feet area per minute. The original papermaker devised a rectangular frame about 2½ inches deep with a woven mesh as the bottom, converting this frame into a box which *we* call a MOLD.

He had prepared a mixed volume of water and fibers which he had reduced by beating to a smaller particle size than their condition of natural growth. This mixture was in the proportion of approximately 99.8 per cent water and 0.2 per cent reduced fibers. Preparatory to dipping his mold into this mixed volume to get the required amount to form a sheet of paper, the mixture was kept in a state of GENTLE AGITATION by stirring. This was done so that the fibers would be kept FLOATING INDIVIDUALLY; they would be *dispersed evenly* through the liquid volume, and the amount dipped up in the mold would be proportionately representative of the consistency of the prepared mixed volume.

As the papermaker raised the mold with its liquid content, he imparted an oscillating movement to the mold which kept the fibers in a GRADUALLY DECREASING state of dispersion as the water DRAINED THROUGH THE MESH bottom of the mold. From a state of dispersed SUSPENSION in liquid to a CONTINOUS FORMATION of individual fibers interlocked with each other was accomplished by an applied movement to the liquid volume *regulated* to the *time* it took to *drain* the water through the mesh. This same method was to be carried out in making paper for hundreds of years by successive generations of papermakers. This *same* application of the PRINCIPLE OF FORMATION remains the same, even though carried out by mechanical means on our huge, modern paper machines. We, therefore, arrive at a BASIC RULE pertaining to formation. Stated briefly, it is:

"The formation of a sheet of paper is *effected* by an EVEN DISPERSION of fibers in liquid; the draining of the liquid through a woven mesh large enough to drain the water but small enough to prevent the passage of fiber; the TIME of drainage to be regulated to the interlocking of the individual fibers into an EVEN and UNIFORM CONTINUITY OF FORMATION."

In application to our modern papermaking, we may state this rule more concisely: *"The drainage of water through the woven wire mesh on which the paper is formed, is the effective force which causes formation to occur."*

Since we accept as a principle the action of water draining through the mesh to *effect* formation, it follows logically that any obstruction in the weave of the wire mesh (small or large) which will *prevent* the drainage of water will also *proportionately prevent* formation in that particular area. For example: should a spot of grease be embedded in the wire mesh there will be a corresponding *hole* in the sheet for the simple reason that water could not pass through the grease and, therefore, formation could not take place at that

particular spot. If the grease spot be very small, smaller than the length of fiber used to make the paper, then it is possible for fibers to interlock in formation *over* the small grease spot. However, there would still be a small *thin* spot in the formed sheet because the presence of the grease spot would *reduce* the *amount* of formation in that small localized area.

Again. Should there be a crack or hole in the wire mesh which is large enough to pass BOTH WATER AND FIBER then there will be a corresponding slit or hole in the formed sheet. In this instance the fiber that would normally have been *retained* on the wire thus becoming a part of the formed sheet passed through an open area larger than the physical dimensions of the fibers and not only did formation *not* take place, the fiber was lost in the white water from this localized area. From these examples of everyday practical papermaking we realize how *necessary* it is that the wire mesh shall be kept CLEAN and of EVEN WEAVE. The dispersion of the fibers in the liquid is necessary. The REGULATION of the drainage TIME of water through the wire mesh is necessary. It is *equally* necessary that the wire mesh itself shall be *evenly* woven and *evenly* clean so that the drainage of water *through* the mesh is equal over the *whole* formation area.

Truly the woven wire mesh is the MOLD and the forming paper is molded. We must be careful in operation to see that the mold is *not* damaged. In cylinder machine operation making TEST board papers, the cheaper pigment dyestuffs are used. Regulation of the *p*H value of the mixed volume is not so accurately controlled as is the case with the finer papers and paper boards. Consequently excess alum and pigment is often precipitated between the facing wire and the backing wire of the cylinder molds. Mixed papers containing fine dirt, floor sweepings and sand, are a major source of raw material. Unless care is taken to properly screen or otherwise clean this prolific source of solid dirt matter, the wire mesh on the various cylinder molds becomes clogged and dirty *in spots* with this foreign material. As there are usually from five to eight molds in simultaneous operation, the THIN SPOTS in the formation of the individual sheets may not exactly coincide in successive sheets to form an actual hole in the sheet or cause a machine break. However, multiple thin spots scattered through the *total* thickness of the sheet results in SPOTTY and UNEVEN MULLEN TEST. Quite often a low *average* mullen test is directly traceable to dirty wires on the cylinder molds.

To obtain EVEN FORMATION, the water *must* drain through the wire mesh *evenly*.

Keep the stock *clean*. Keep the wire mesh *clean*.

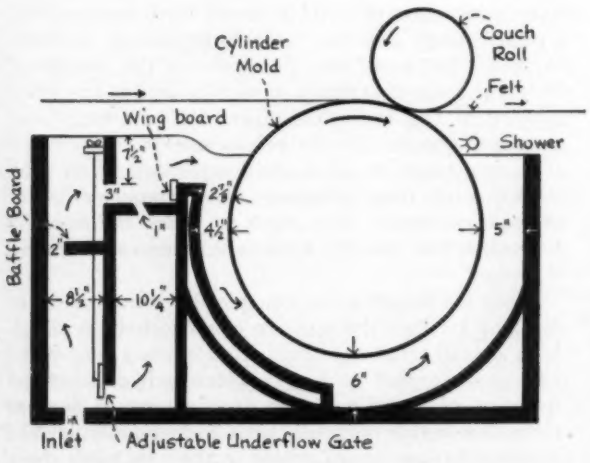


Fig. 2—Baffled counter flow vat. Vat with one baffle board in first compartment, underflow gate and angle flow from second compartment operating at top speed of 330 fpm on folding box board, bark liner stock. (Note wing boards making board)

Answer to Question No. 2

Commencement of Formation Defined

Standing in front of the machine we note in Figure 2 the cylinder mold is revolving clockwise. The formed sheet, couched from the face of the mold by the pressure of the couch roll, is now being carried by the felt to the next cylinder mold. The wire mesh face of the revolving mold, freed from the paper, is now passing the pressure shower. The function of this PRESSURE shower is to keep the WIRE MESH CLEAN and OPEN. This section of the revolving mold, from one-twelfth to one-eighth of the circumference, is the *only* section of the wire mesh to be FREE and CLEAR of a FORMED or FORMING sheet during papermaking operations.

As the passage of water through the wire mesh is the effective FORCE which CAUSES formation to occur, then the instantaneous fraction of time at which this *cleaned section* of wire face mesh comes in contact with the mixed volume of fiber and water in the circle the water *rushes* through the cleaned wire mesh leaving the fibers interlocked on the surface of the wire. FORMATION HAS COMMENCED. The *amount* and *speed* of formation taking place at this point depends on three very important factors:

(1) The differential in head height of the water level in the circle and the water level on the inside of the revolving mold.

(2) The size or number of mesh per square inch comprising the weave of the facing wire; 29—35—45—55—60 etc., the *coarser* the mesh the *faster* the water will rush through the clean wire and the faster the *rate* of formation. Number 29 is the coarsest mesh and number 60 is the finest in the sizes quoted.

(3) The *freeness* or *slowness* of the prepared stock. The more free the stock the *faster* the *rate* of formation and conversely the slower the stock the more *slow* the *rate* of formation. The terminology free and slow are the common terms used to define the *rate* at which the fibers part with water. Ae we have noted that formation is effected by the passage of water through a wire mesh, then, obviously the rate at which the water passes through the mesh governs the TIME RATE OF FORMATION.

We may accept as a BASIC RULE, therefore, that formation commences the instant the cleaned section of the cylinder mold facing wire mesh begins to submerge in the mixed volume contained in the circle.

Answer to Question No. 3

Formation Continues Until Density is Effected

We have noted that formation *commences rapidly* because the wire mesh is cleaned by pressure shower and *until* formation commences there is *no* obstruction of forming fibers to resist the passage of water to the surface of the wire mesh. As the sheet continues to form the resistance to the passage of water is increased; the water now has *first* to pass through the INTERSTICES BETWEEN THE FORMED FIBERS and *then* to pass through the wire mesh. In so doing the water continues to leave more fibers in these voids between the fibers already "formed" gradually increasing the CONTINUITY and DENSITY of formation. This action *is* formation. As the density of formation increases there is a proportionate resistance to the passage of water and consequently a proportionate *slowing down* of the *rate* of formation.

When the formed density of the sheet offers *greater* resistance to the passage of water than the exerted pressure force of the STATIC HEAD then flow of water from the circle *to* the inside of the revolving mold *stops*, and at this point FORMATION is completed.

We may, therefore, formulate Rule Number 3: "Formation will continue round the circumference of the mold *until the density of the formed sheet prevents further passage of water through the wire mesh.*"

Cameron's Hydraulic Data, published by Ingersoll-Rand Co., gives us the following definition of "Static Head": "The difference between two liquid levels exerting their pressure against each other: Static Head is the vertical distance in feet between the free level of the source of supply and the point of free discharge, or to the level of the free surface of the discharge water." In the operation of a cylinder mold, "the free level of the source of supply" is the level of the *mixed volume* in the circle, *outside* the mold, and the "free level of the surface of the discharge water" is the level of the white water *inside* the mold.

The difference in height between these two levels is the STATIC HEAD PRESSURE. By the operator this difference in height is commonly called suction and in his operation of the machine he usually says he is putting on or taking off suction as he changes the level DIFFERENTIAL. If we say we are going to "put on more suction," it means we intend to either *raise* the level of the mixed volume *outside* the mold by adding water, stock, or both or *lower* the level of the white water *inside* the mold by lowering the dams or opening the discharge.

The DIFFERENCE IN LEVEL between the two free surfaces of the liquid volumes inside and outside the revolving mold exerts a pressure *equally* over every square inch of wire mesh forming area *submerged* in the *mixed* volume. IT IS THIS PRESSURE, plus capillary attraction, that MAKES FORMATION POSSIBLE on a cylinder mold. If the level of water inside and outside the mold was equal then the pressure per square inch of the one against the other would be equal and there could be *no flow* of water from the outside to the inside and, therefore, formation could *not* take place.

Harry Williamson —author of Paper and Paperboard Making

We have presented . . . .

THE FOREGOING ARTICLE is the sixth in a series being presented by *The Paper Industry* from Harry Williamson's forthcoming book on *Paper and Paperboard Making*.

Following is a summary of the articles that have appeared:

Hydration

This subject was introduced with a discussion on the fundamentals of HYDRATION. The author then took up the subject of sheet formation as it is related to hydration, comparing methods used by early papermakers with modern methods. Principles involved in the early manufacture of papyrus were described; evolution of present processes of fiber treatment and sheet formation were outlined. [Part 1, March (1950); Part 2, April (1950); Part 3, May (1950)]

Questions on Beating

In the fourth installment (published in June, 1950), Mr. Williamson answered seventeen questions on the subject of BEATING. Here were outlined the practical aspects of beater room operation including the analysis and interpretation of control test data.

Cylinder Machine

Beginning with the July (1950) issue, the author took up the subject of the Cylinder Board Machine, describing its purpose, construction, and auxiliary equipment. Operation of the cylinder machine was illustrated by a drawing of the counter flow vat showing the principle of formation on this type of paper machine.

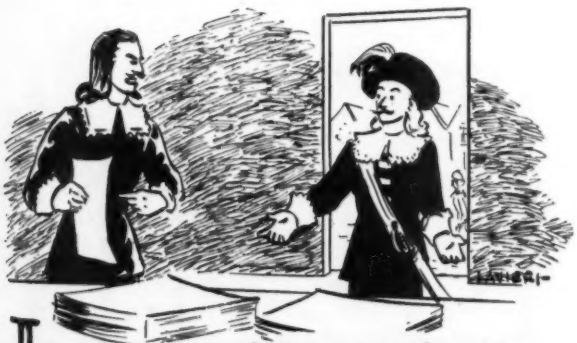
Formation Questions

Only two of the questions listed at the beginning of the foregoing installment (VI) have been answered in this issue. Answers to the remaining questions will be taken up in succeeding installments.

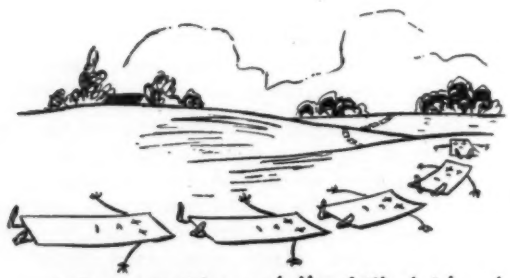
PAPER SKETCHES

IN 8th century Egypt, papyrus made by Arab craftsmen was inscribed with the names of governors, tax collectors, and other public officials.

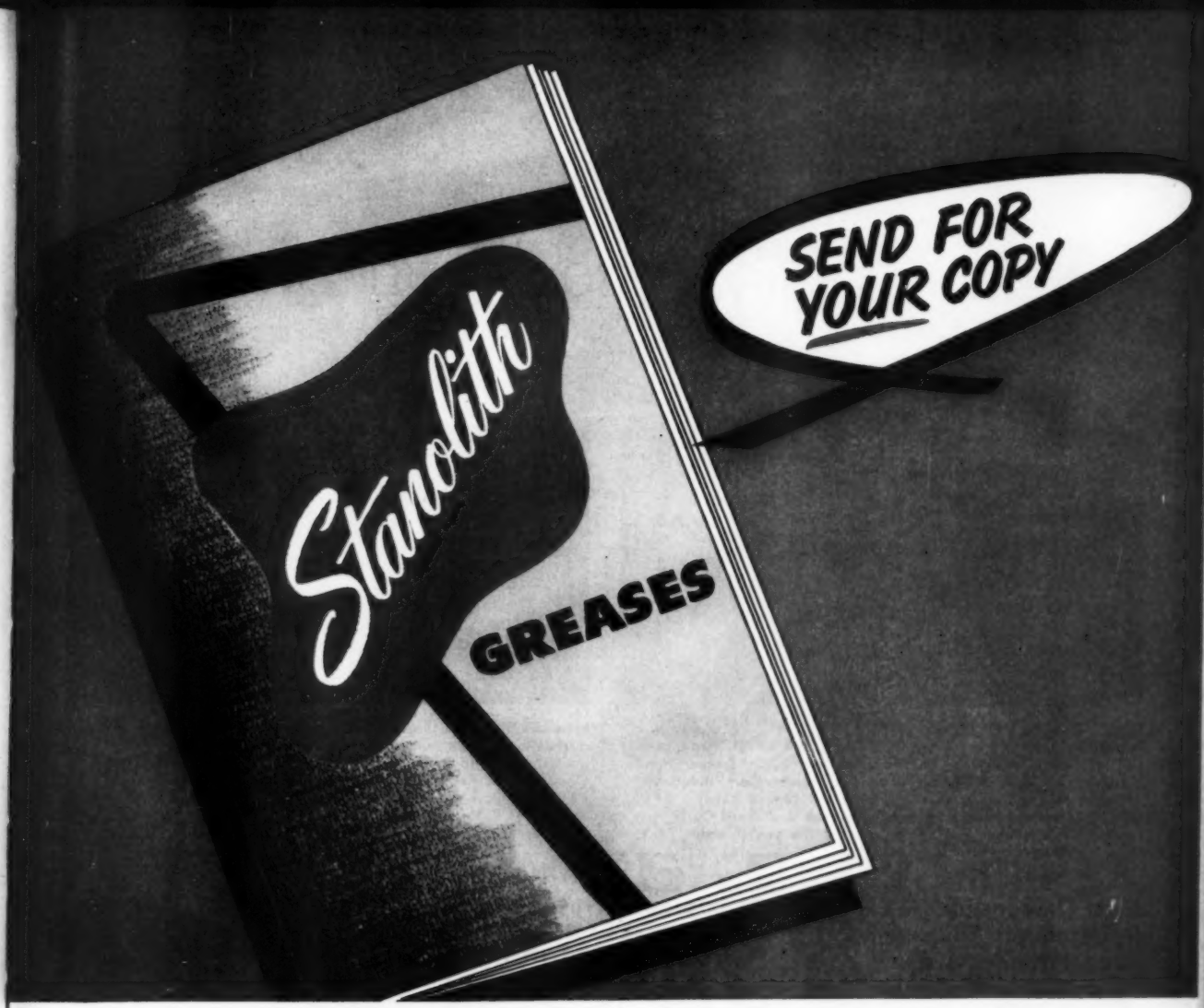
A PIONEER California paper mill of the 1850's annually produced 6 tons of paper, using as rags the clothing cast off by those seeking their fortunes in the gold rush.



In the reign of King William III, Huguenot papermakers in England were permitted to put up two quires of spoiled sheets with every ream of paper.



A BILLION one dollar bills laid end to end, would stretch from Manchester, Connecticut to Los Angeles, California 32 times!



Here's help for bearings in "HOT WATER"

New booklet tells how STANOLITH Greases solve wet-hot problems

HOW TO LUBRICATE bearings which operate under extremely wet conditions, and at the same time, are subjected to high temperatures? If that is one of your problems, the booklet illustrated above holds the solution.

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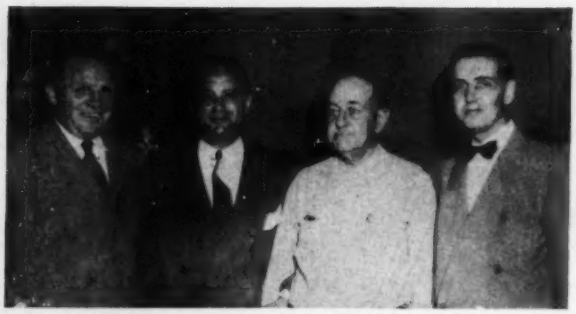
STANDARD OIL COMPANY (INDIANA) STANDARD

The Paper Industry Association News



NEWLY-ELECTED OFFICERS of the Michigan Div. of the Superintendents Association are: L to R, Richard Peeters (St. Regis Paper Co.), first vice chairman; O. W. Callighan (Edgar Brothers Co.), chairman; C. B. Smith (Noble & Wood Machine Co.), Industrial Affiliates representative; Frank H. Hamilton (Allied Paper Mills), secretary. Harvey Hartman (American Box Board Co.) second vice chairman, was not present for the photograph

Members of the Michigan Division's Sports Committee who were responsible for planning the annual event assembled for this photograph. L to R—Leon Hank (National Gypsum Co.), Fred Goodwill (St. Regis Paper Co.), John L. Vanderberg (R. T. Vanderbilt Co.), C. B. Smith (Noble & Wood Machine Co.), and James R. Verdan (American Cyanamid Co.). Competing for prizes in the sports events were 72 golfers

New Officers Elected by Michigan Division Superintendents Ass'n

The annual sports and field day program of the Michigan Division of The American Pulp and Paper Mill Superintendents Association was held at Gull Lake Country Club, Kalamazoo, Mich., July 18. This affair drew a large attendance—72 golfers, with 104 persons present at the dinner.

At the business meeting held following the field day program, the following new officers were elected to serve the Division for the year 1950-1951:

Chairman—O. W. Callighan, Edgar Brothers Co., Kalamazoo. Mr. Callighan served as vice chairman for the past year.

First Vice Chairman—Richard H. Peeters, St. Regis Paper Co., Kalamazoo.

Second Vice Chairman—Harvey W. Hartman, American Box Board Co., Grand Rapids, Mich.

Secretary—Frank M. Hamilton, Allied Paper Mills, Kalamazoo.

The Division's retiring chairman was William F. Hathaway, KVP Co., Parchment, Mich.

The first fall meeting of the Division will be held at Hotel Harris, Kalamazoo, Mich., September 21, 1950.

Champion Is Host to Committees of American Pulpwood Association

As guests of Champion Paper and Fibre Co. at the Club House on Lake Logan, near Canton, N. C., July 11 and 12, members of the Appalachian and Southeastern Technical Committees of the American Pulpwood Association met to discuss "Methods of Logging and Handling Pulpwood." A group of 18 men from both committees attended the gathering.

The discussions of July 11 were confined to Appalachian Methods of Logging Pulpwood. This portion of the meeting was conducted by D. W. Sowers, Jr., West Virginia Pulp and Paper Co., who listed and described the different types of pulpwood logging used to get pulpwood to the six mills of his firm. Mr. Sowers also presented the results of a rough inventory of the powered equipment used to take pulpwood to his company's mills; A. L. Bennett, in reporting for the Armstrong Forest Co., supplemented Mr. Sowers's report.

As chairman of the Southeastern Technical Committee, Lucien Whittle, Brunswick Pulp and Paper Co., conducted the July 12 discussion of efficient methods of loading and unloading pulpwood. In this discussion, the efficiency of the pallet system of unloading and loading pulpwood for smaller sized operations was emphasized, as was the need for large volumes and steady production to hold costs down when heavier equipment—such as cranes or rapid conveyors—are used in the loading or unloading of pulpwood.

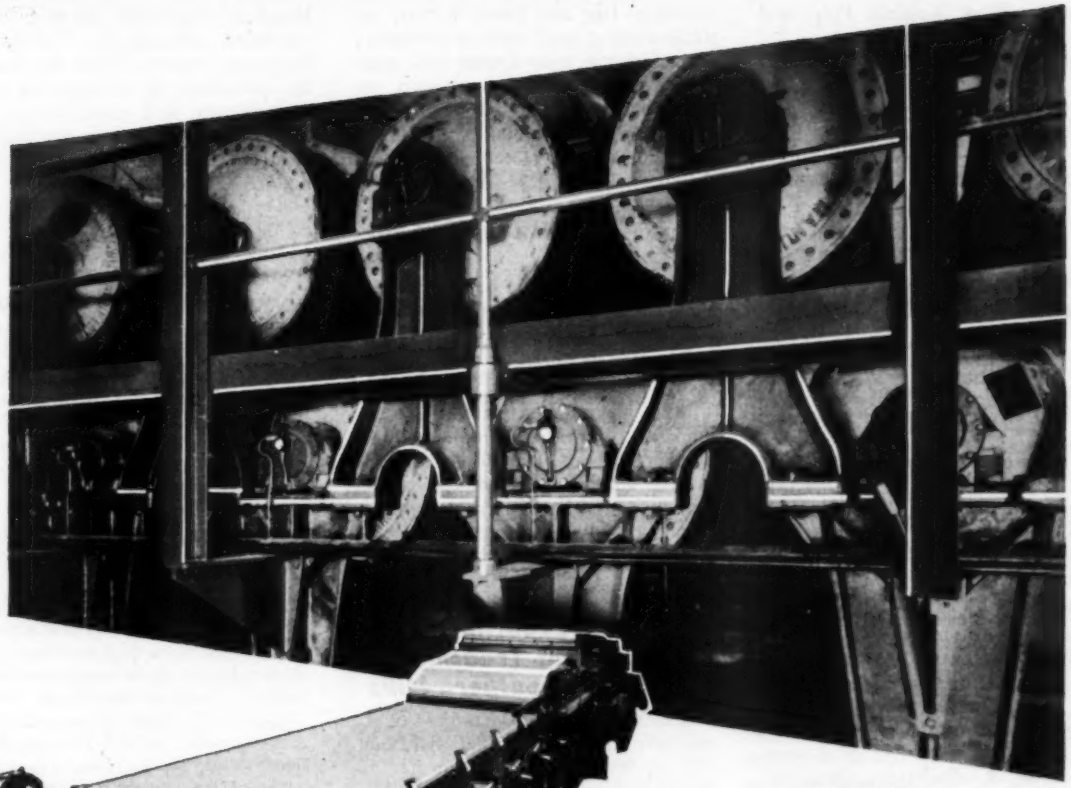
P & P Committee Set Up By Nat'l Council for Stream Improvement

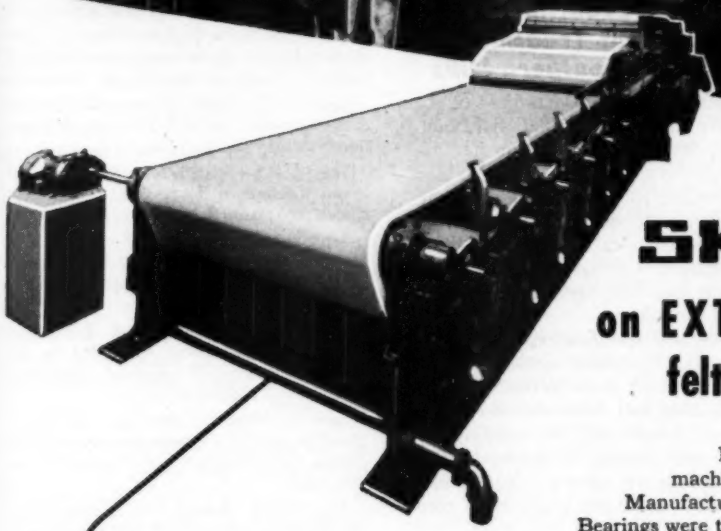
At a recent meeting of the National Council for Stream Improvement held at the Ten Eyck Hotel in Albany, N.Y., a standing committee of the pulp, paper, and paperboard industry was organized. The committee, to be known as the New York Section of the Council, was organized by the more than fifty representatives of pulp, paper, and paperboard manufacturers present at the meeting.

Benton R. Cancell, St. Regis Paper Co., was elected chairman, and Harry M. Gray, Oswego Falls Corp., was chosen vice chairman. To organize activities in the various sections of the state the following executive committee was chosen:

Lower Hudson River—P. S. Bolton, Robert Gair Co., Inc.

Upper Hudson River—Milton J.





SKF, 889 TIMES

on EXTRA LARGE felt and liner board machines

In building these two large felt and liner board machines for U. S. Gypsum Company, Downingtown Manufacturing Company found 889 locations where SKF Bearings were the answer to the problem of minimizing friction.

On the largest machine at Clark, N. J., are 478 SKF Spherical Roller Bearings, 123 of which use Rocker Mounted Housings. On the installation at South Gate, Cal., are 411 Spherical Roller Bearings, 90 of which use Rocker Mounted Housings.

Once again, a paper-making machinery manufacturer has depended on the pioneering character of SKF engineering to help put the right bearing in the right place. **SKF** INDUSTRIES, INC., PHILADELPHIA 32, PA., *the Pioneers of the Deep Groove Ball Bearing, Spherical Roller Bearing, Self-Aligning Ball Bearing.* 7121

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BALL AND ROLLER BEARINGS

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Surface Finish — Product Uniformity — Engineering Service — Field Service

Neubauer, West Virginia Pulp and Paper Co.

East Lake Ontario—J. H. Heuer, St. Regis Paper Co.

West Lake Ontario—H. P. Bailey, International Paper Co.

St. Lawrence River—James Rogers II, J. and J. Rogers Co.

Am. Society for Testing Materials Elects New Officers for '50-51

At the fifty-third annual meeting of the American Society for Testing Materials held in Atlantic City, N.J., recently, L. J. Markwardt, assistant director, U. S. Forest Products Laboratory, Madison, Wis., was elected president of the Society. Mr. Markwardt, associated with the Forest Products Laboratory since 1917, has been a member of the Association's Committee D-7 on wood for many years, and is currently serving as its chairman.

The new vice president is T. S. Fuller, engineer in charge of works laboratory, General Electric Co., Schenectady, N.Y. The five new members of the board of directors, who will serve with ten others elected in other years, include B. A. Anderson, consultant, Barrett Division, Allied Chemical and Dye Corp., Research Laboratory, Edgewater, N.J.; R. H. Brown, sales engineer, Parks-Cramer Co., Fitchburg, Mass.; D. K. Crampton, director of research, Chase Brass and Copper Co., Inc., Waterbury, Conn.; H. G. Miller, mechanical engineer, Chicago, St. Paul & Pacific Railroad Co., Milwaukee; and J. R. Trimble, assistant manager, department of metallurgy, inspection and research, Tennessee, Coal, Iron and Railroad Co., Birmingham, Ala.

These officers, with Senior Vice President Frank E. Richart, research professor of engineering materials, University of Illinois; and Executive Secretary C. L. Warwick of Philadelphia, will serve the Association for the 1950-51 term.

New Association Is Formed—Bag & Cover

At an organization meeting held at the Blackstone Hotel, Chicago, last month, a new association, named The Industrial Bag and Cover Association, was formed to serve members of that industry. Manufacturers of such items as mattress and crib bags, can bags, furniture bags, broom covers, casket covers, tubing, freight carliners and plastic film bags are among the members of the new group.

Purposes of the Association will be to create a Standards program for the industrial bag and cover industry, to study existing tariff matters pertaining to the industry, to co-operate with other groups or agencies where such co-operation is of importance to problems affecting industry products, and to act jointly on matters of common interest.

Officers of the new Association are:

President—David Maxwell Weil, chairman of board of Cromwell Paper Co., Chicago

Vice president—H. C. Davis, manager, Paper Specialty Plant, Bemis Bro. Bag Co., St. Louis

Secretary-treasurer — Phillip O. Deitsch, 19 West 44 St., New York

Mr. Deitsch, active in several branches of the paper industry for a number of years, was also designated as the administrative officer of the group; it will be his responsibility to carry out the principles approved by the Association at its organization meeting.

System of Experimental Kraft Effluent Treatment May Go To Southern Mills

The Technical Subcommittee of the Southern Region of the National Council for Stream Improvement has authorized the preparation of plans and specifications for an experimental treatment system to do development work on the biochemical treatment of kraft mill effluent. Laboratory work on the problem has just been completed by the Subcommittee.

Plans and specifications of the experimental treatment system will be sent to all kraft mills in the South for examination and determination of the interest of each mill in building the system and assisting in the work. Two mills had shown interest in giving such assistance before the plans were completed.

SCHEDULED FOR September 14 through 16, the 1950 fall meeting of the New York-Canadian Division of The American Pulp and Paper Mill Superintendents Association, Inc., will be held at the Chateau Laurier Hotel, Ottawa, Canada, in accordance with the Division's custom of holding the yearly meeting in Canada every third year. Donald R. Dick, Howard Smith Paper Mills, Ltd., is chairman of the Division.

CURRENT WORLD CONDITIONS have influenced the board of directors of the Society of Industrial Packaging and Materials Handling Engineers to hold a "Military Packaging Review" in conjunction with the Fifth Annual Industrial Packaging & Materials Handling Exposition in place of the previously-announced "Government Packaging Review." The Review will be presented in Convention Hall, Philadelphia, at 2 p.m., Tuesday, October 10, rather than at the Bellevue-Stratford Hotel on October 9, as announced earlier.

UNDER AUSPICES OF THE American Society of Mechanical Engineers, the nineteenth National Exposition of Power and Mechanical Engineering will be held in Grand Central Palace, New York, November 27 through December 2. Held in conjunction with the Society's annual meeting, the exposition will be managed by International Exposition Co., whose president is Charles F. Roth.

Coming Events

Aug. 7-20—First United States International Trade Fair, to be held in Chicago.

Sept. 5-9—Sixth National Chemical Exposition by Chicago Section of the American Chemical Society, at the Chicago Coliseum.

Sept. 11-23—Sixth Educational Graphic Arts Exposition, to be held at the International Amphitheatre, Chicago.

Sept. 13-15—Second TAPPI Testing Division Conference, to be held at Eastman Kodak Co. plant, Rochester, N.Y.

Sept. 15-16—Annual Fall Meeting of Northwestern Division of the Superintendents Association, at the Schroeder Hotel, Milwaukee, Wis.

Sept. 18-22—Fifth annual Instrument Conference and exhibit, sponsored by Instrument Society of America, Memorial Auditorium, Buffalo, N.Y.

Sept. 21—First fall meeting of the Michigan Division of the Superintendents Association, to be held at Hotel Harris, Kalamazoo, Mich.

Sept. 21-23—Annual fall meeting of the Northeastern Division of the Superintendents Association, to be held at Poland Spring, Me.

Sept. 30—Connecticut Valley Division of the Superintendents Association will meet at Red Lion Inn, Stockbridge, Mass.

Oct. 2-5—Fifth annual TAPPI Engineering Conference, Netherlands Plaza Hotel, Cincinnati, O.

Oct. 16-20—38th Annual Congress and Exposition of the National Safety Council, Stevens Hotel, Chicago.

Oct. 25-27—Alkaline Pulping Conference of TAPPI, at George Washington Hotel, Jacksonville, Fla.

Nov. 12-13—Fibrous Agricultural Residue Conference of TAPPI, at Peoria, Ill.

Nov. 27-Dec. 2—Nineteenth National Exposition of Power and Mechanical Engineering, to be held in Grand Central Palace, New York.

April 17-20, 1951—20th National Packaging Exposition of the American Management Association, to be held in Atlantic City, N.J.

The Paper Industry Allied News

Wallace Clark & Co. Incorporates

Mrs. Wallace Clark, who has headed Wallace Clark & Co., international management consulting firm, since her husband's death in 1948, has announced the incorporation of the business under the name Wallace Clark & Co., Inc.

As president, Mrs. Clark will continue direction of company activities, while technical aspects of the work will remain the responsibility of senior staff engineers who were trained by Mr. Clark. Company policy will continue unchanged.

Directors of the firm are Mrs. Clark, Alfred C. Bruce, William E. Camp, J. Coburn Musser, William B. Nichols, and David Remer.

NEW YORK OFFICES of J. O. Ross Engineering Corp., which have been located at 350 Madison Ave., were moved to new and larger quarters at 444 Madison Ave., August 1.

A DISTRICT OFFICE has been opened by the Kraft Paper and Board Sales Division of St. Regis Paper Co., New York, at Los Angeles. T. E. Button is manager of the new branch.

AN INTENSIVE CONFERENCE on the latest developments in the design, manufacture, and application of product cleaning and rustproofing processes, equipment and chemicals was attended by industrial division managers for all regions in the United States at the home office of Detrex Corporation, Detroit. Detrex managers also discussed new plans for merchandising the items studied, as well as methods of extending consultation and free inspection services.

A SELF-ADHESIVE PRINTED paper tape has been perfected by Topflight Tape Co., York, Pa. Processed in rolls, the new tape can be used in the same way, and the same dispensers, as the firm's cellulose tapes.

CORPORATE NAME OF National Technical Laboratories has been changed to Beckman Instruments, Inc., so that the name will be associated more closely with the trademark of the firm's principal products. No other changes are involved; company organization, policies, personnel, and products remain the same, as do the locations of factory and service branches in New York, Chicago, and South Pasadena, Cal.

CONTRACTS FOR ENGINEERING and procurement of a large new chlorine and caustic soda plant to be located at Saltville, Va., has been awarded the chemical plants division of Blaw-Knox Co. by Mathieson Hydrocarbon Chemical Corp., Baltimore, Md. The new unit, expected to go into operation in 1951, will use the Mathieson mercury cell technique and licenses.

ADDITIONAL SPACE AT 19 Rector St., New York City, has been taken by H. K. Ferguson Co., Cleveland, to accommodate increased engineering and construction commitments in the Eastern part of the United States and abroad.

NOW REPRESENTING Graver Water Conditioning Co., New York, in the Atlanta, Ga., territory are Evans L. Shuff & Associates. The Shuff organization is located at 303 Five Ivy Building, Atlanta.

CO-ORDINATION OF research, experience and engineering of Nichols Engineering Research Corp., New York, and A/S Niro Atomizer, Copenhagen, Denmark, has resulted in the establishment in New York by the Nichols firm of the Nerco-Niro Spray Dryer Division. The atomizers for the spray dryers will be manufactured in Copenhagen, but all other parts of the machine will be produced in the United States. A/S Niro Atomizer has installed more than two hundred industrial spray drying plants in twenty-three foreign countries; the first American installation is now under construction.

A NEW WASTE PAPER PLANT has been constructed by Dalkoff Co., Rock Island, Ill. The fireproof building will house all modern baling presses, shredders and scales.

AN EXCLUSIVE LEASE TO CUT sawgrass on state-owned land has been given Carl L. Sackett of Leesburg, Fla., by the state Cabinet at Tallahassee, Fla. Under terms of the lease Sackett, who reportedly plans to manufacture paper from the sawgrass, will pay no fee to the state for four years but will be required to build a paper mill during that time. After the four year period, Mr. Sackett will be charged 50 cents an acre annually for 30 years, and $1.00 an acre annually for the next 20 years.

A NEW PAPER MILL for reprocessing of corrugated boxes is being planned at River Road near Bolton, Ga. The proposed forty-acre plant site, now owned by A. O. Mitchell of Atlanta, Ga., has been approved by the Cobb County Planning Commission. The plant, said to be patterned after the Carolina Box and Board Co., plant at Austell, Ga., is expected to cost about $432,000 and will employ about 300 workers. The commission was told that the plant will be built by Gibraltar Paper Co. of New Jersey.

A NEW SALES OFFICE opened in Grand Rapids, Mich., by Wheelco Instruments Co., Chicago, will service all of the state of Michigan but Detroit. Operating under the supervision of the Detroit district office, R. P. Campbell, sales engineer, will be in charge of the Grand Rapids office.

CONSTRUCTION IS UNDER way on an addition to the main plant and office of H. G. Weber Co. at Kiel, Wis., which will cost approximately $40,000. The new addition, covering an overall space of 70 x 85 ft., will house new engineering quarters and will give additional office space as well as additional shop facilities for assembly. The company manufactures paper bag machinery.

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NATIONAL SAFETY COUNCIL

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The Paper Industry Safety News

U. of I. Offers Series of 5 Related Courses in Industrial Safety

A series of five related courses on the subject of industrial safety has been announced by George W. Harper, associate professor of safety education, University of Illinois, Division of University Extension, Champaign, Ill.

This industrial safety program is in response to a demand from industrial safety men, as well as a direct result

George W. Harper

of the Governor's Conference on Industrial Safety. The five related courses are:

1—Basic Industrial Safety
2—Engineering Illustration
3—Technical Report Preparation
4—Elements of Supervision
5—Industrial Engineering applied to safety.

These courses will open with the beginning of the fall semester. Once the classes have been initiated, it is hoped they will develop into sufficient scope to support a correspondence program. No college credit will be given; however, the Division of University Extension will award two types of certificates for successful completion of these courses. A course certificate will be awarded for satisfactory completion of each of the courses in the program. An industrial safety curriculum certificate will be given those who satisfactorily complete all the courses.

Mr. Harper is general chairman of the Pulp and Paper Section of the National Safety Council.

Three Flintkote Depts. Earn Safety Awards From Amer. Mutual

At a department supervisors' safety meeting held at the New Orleans, La., plant of Flintkote Co. recently, three supervisors received certificate awards in behalf of their departmental personnel from American Mutual Liability Insurance Co.'s representative, James H. Gordy.

To qualify for such an award, an industrial plant or its departments must achieve 250,000 man-hours without a lost-time accident, over a period of 12 consecutive months. Of the three awards presented, highest honors went to Robert L. Nall for the mechanical department's 268,993 safe hours in 12 months. Walter J. Schwarz of the laboratory department accepted the second place award for his department's 256,236 safe hours gained over a 48 month period; third place for 252,038 man-hours in 21 months went to Fred J. Peyregne, who accepted the certificate for the roofing finishing department.

Frequency Rate Shows Decline For Mills in P.I. Safety Contest

Cumulative scores for the first five months of the paper industry safety contest show a slightly lower average frequency rate than recorded at the end of four months. The rate decrease from 9.88 to 9.72 was two per cent. Both divisions made improvements in the cumulative rate. The frequency rate for Converting was down five per cent, and the Pulp and Paper Division was reduced one per cent.

Reports at the close of the fifth month show 83 mills holding perfect scores:

Division I—Pulp and Paper Mills

Group A	1
Group B	4
Group C	11
Group D	32
	48

Division II—Paper Converting

Group A	2
Group B	7
Group C	26
	35

Ned Dearborn Speaks at Dedication of New Safety Laboratory

About 400 leaders in the fields of safety and industrial hygiene and health were present at the recent dedication of the world's largest research laboratory devoted to the development of safety equipment for all industries by Mine Safety Appliances Co. at its Pittsburgh headquarters.

Principal speaker at the dedication ceremonies was Ned H. Dearborn, Chicago, president of the National Safety Council. Mr. Dearborn called the new laboratory the "embodiment of a scientific purpose without reproach. It represents not only science at its best, but human purpose at its finest."

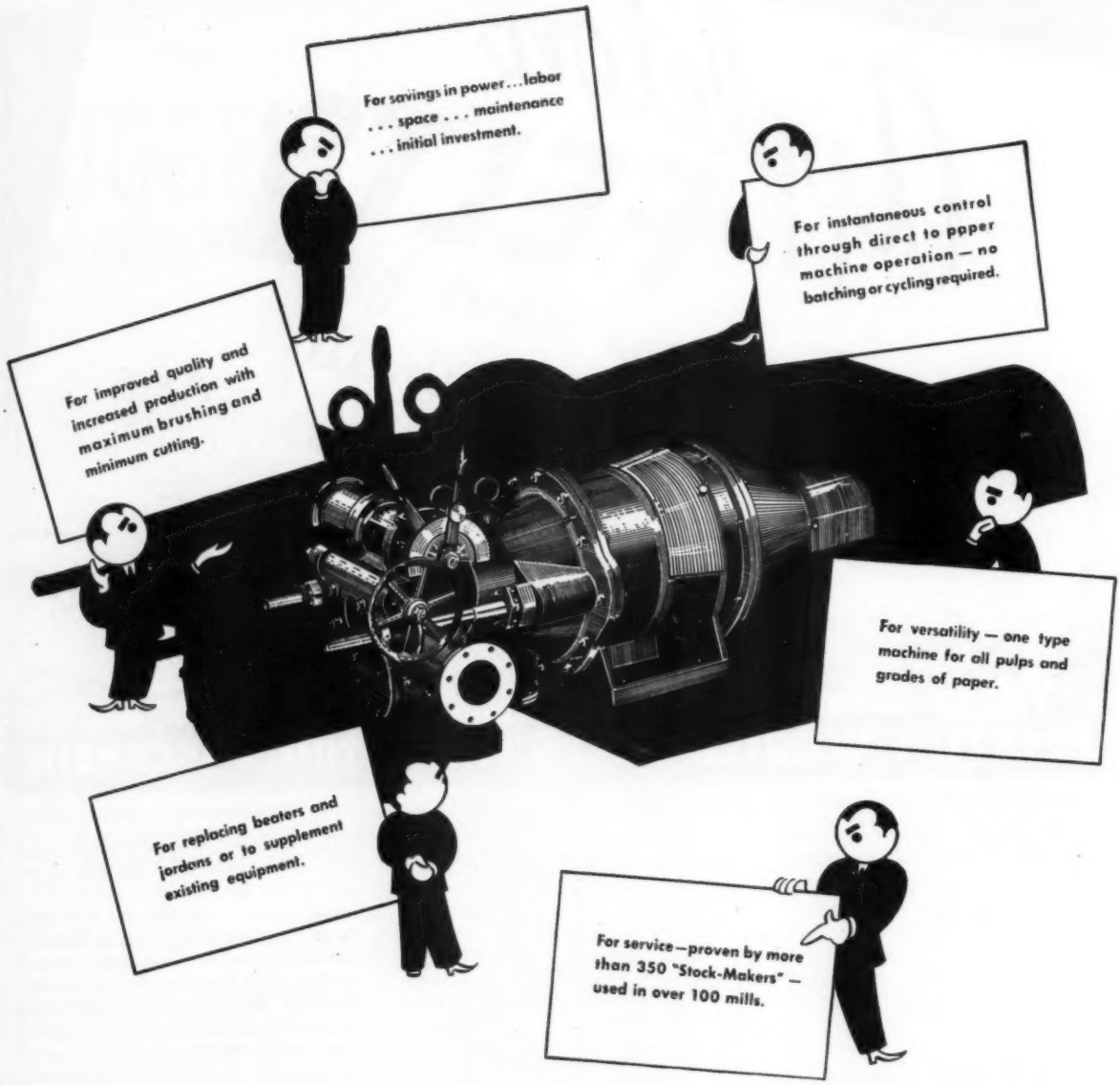
The new laboratory was dedicated to the memory of John T. Ryan, cofounder of Mine Safety Appliances Co., who passed away in 1941. Mine Safety Appliances Co. was originally formed by Mr. Ryan and George H. Deike, president of the firm, to supply apparatus, equipment and instruments to protect lives and property in the mining industries; the company's work has branched out and expanded to all branches of industry until it is the largest manufacturer and supplier of safety equipment in the world.

Facilities of the new laboratory will be used to develop equipment and devices to combat hazards of all types; among the new fields to be studied are air pollution and atomic energy. Equipment includes an electron microscope that permits study of dusts and other substances at a magnification up to 100,000 times.

A NEW TRAINING FILM showing how to handle and unload freight safely has just been prepared by the National Safety Council. Using a safety-unconscious leading character called "Happy Jack," who does all the wrong things from the standpoint of safety as an example, the film combines safety information with amusement. The film, titled "Freight Handling Safety," is available for purchase, preview or rental from the National Safety Council, 425 No. Michigan Ave., Chicago, in 35 mm sound slidefilm or 16 mm film for sound-motion projectors.

WITH THE COMPLETION OF 109 consecutive accident-free days, employees of the Port Edwards mills of Nekoosa-Edwards Paper Co., Port Edwards, Wis., on June 21 established a new safety record. By July 7, the Port Edwards mill had completed 126 days without an accident, a company record that is exceeded only by the Nekoosa mill's record of 135 consecutive days without accident.

A SECOND-TIME AWARD HAS been presented to employees of Ecusta Paper Corp., Pisgah Forest, N. C., and its companion company, Endless Belt Corp., by Liberty Mutual Insurance Co. for an outstanding industrial safety record. The more recent record represents a record of 3,521,059 man hours without a lost time accident since January 1, 1949.


For savings in power...labor ... space ... maintenance ... initial investment.
For instantaneous control through direct to paper machine operation — no batching or cycling required.
For improved quality and increased production with maximum brushing and minimum cutting.
For versatility — one type machine for all pulps and grades of paper.
For replacing beaters and jordans or to supplement existing equipment.
For service—proven by more than 350 "Stock-Makers" — used in over 100 mills.

Any way you look at it!

The Morden "Stock-Maker" is superior for Beating and Refining

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in England
Millspaugh, Limited, Sheffield

The Paper Industry Names in the News

Robertson Made Board Chairman of Champion—R. B., Jr., Suceeds Him

President of the company since 1946, Reuben B. Robertson has now been made chairman of the board. This announcement followed a general board meeting held in Houston, Tex., July 27.

Suceeding his father as Champion president is Reuben B. Robertson, Jr., who has been executive vice president of the company.

Mr. Robertson, Sr., has been with the company since 1907, at which time

R. B. Robertson

R. B. Robertson, Jr.

he took over the supervision of construction of the company's new mill at Canton, N. C. After serving as general manager and vice president, he became president of the Champion Fibre Co. in 1925, serving in that capacity for ten years. He became executive vice president of The Champion Paper and Fibre Co. when reorganization consolidated operations of the Hamilton and Canton mills. Mr. Robertson succeeded to the presidency of the company following the death of Logan G. Thomson in September, 1946. He is widely known as a leader in the paper industry; having served for two years as president of the American Paper and Pulp Association (1945-1947). During World War II he was affiliated with the RFC, the CED, NWLB, the President's Labor Industry Conference, and Business Advisory Council Dept. of Commerce.

The new Champion president, Mr. Robertson, Jr., has been with the company since 1928. He has served in all departments and divisions including the mills at Hamilton, Canton, N. C., and Houston, Texas. He became vice president in 1946, and the same year was made executive vice president. He is a graduate of Yale and its Sheffield Scientific School where he received his B. S. degree in chemical engineering.

At the same meeting, Charles C. Benedict, Cincinnati attorney who has served on the board since 1929, was elected a director emeritus. Other directors re-elected are: Henry S. Bowers, New York; Harry G. Pounsford, Lewis Clark Thomson, Dwight J. Thomson and John J. Rowe, all of Cincinnati; Herbert T. Randall and Herbert W. Suter, Hamilton, and Reuben B. Robertson, Canton.

Kurtz Hanson Succeeds A. M. Howe as Pres. of Champion-International

Upon the recent resignation of A. Murray Howe as president of Champion - International Co., Lawrence, Mass., Kurtz M. Hanson was elected to the office. Mr. Howe's resignation ended more than 30 years of service to the firm. Previous to this election, Mr. Hanson had been an executive consultant in the management of the firm for some time.

Several other company officers were elected at the same meeting. Thomas W. McKnew will serve as first vice president; Sheldon E. Wardwell is vice president, assistant treasurer and clerk; Joseph F. Raichlen will be vice president in charge of sales; Norman I. Bearse was chosen vice president for production; and Roland B. Hammond is treasurer. Mr. Bearse and Mr. Raichlen, as well as Robert V. Fleming, were at the same meeting elected to the board of directors.

Union Bag and Paper Promotions Affect Ten

Several changes and promotions in the supervisory staff of the Bag Division of the Savannah plant of Union Bag and Paper Corp., New York, as well as the creation of one new position in the Mill Division, have been effected.

The former superintendent of the Multiwall Department, V. E. "Tex" Kelly, has been appointed to the new position of assistant to the manager. Mr. Kelly's former position has been assumed by John W. Williams; Richard Braithwaite was named to succeed Mr. Williams as assistant superintendent of the department.

The former superintendent in the Finishing, Storage and Shipping Department, R. B. Sowell, assumed the position of the superintendent of the Standard Grocery Department; assisting him is Noel Lee.

Replacing Mr. Sowell in the Finishing, Storage and Shipping Department is L. R. Lighter, whose former work as general foreman of Bag Storage and Shipping has been assumed by J. L. Richards. Mr. Richards, former general foreman of Paper Storage, is succeeded by F. N. Ciucevich. New shift foreman is T. R. Swinford.

Filling the new position of assistant superintendent of the Paper Processing Department is James E. Hungerpiller.

Dr. Foote Appointed To Head Diamond's Pulp & Paper Div.

The appointment of Dr. James E. Foote as manager of the Diamond Match Co., New York, pulp and paper division was made late in June. Dr. Foote, who holds both an M. S. and Ph. D. degree from the Institute of Paper Chemistry, has been with Diamond since 1941.

Dr. James A. Foote

Previous to his association at Diamond, where he has served as chief chemist, technical director and assistant manager, Dr. Foote had been a chemist for Munising Paper Co., and chief chemist for Fox River Paper Co.

Three Hercules Powder Co. Appointments

Three appointments in the administrative sales personnel of the Synthetics Department have been made at Hercules Powder Co., Inc., Wilmington, Del. Henry Thouron, assistant director of sales for the Synthetics Department

LIGHTNIN Mixer gets results

FOR WEST COAST PULP MILL . . .

Fluid Blending and Solids Suspension Problem— One of Many Solved by Mixco Engineered Agitation

PROBLEM: A large West Coast pulp mill desired to blend two miscible liquids to uniformity, and to maintain a uniform suspension of the precipitated crystals formed.

Total flow rate of both components was 380 GPM. The light component (13% by volume), had a sp. gr. of 1.25 and viscosity of 1 cp. The heavy component (87% by volume) had a sp. gr. of 1.25 and viscosity of 100 cpp. Solids formed amounted to approximately 2 lbs. per gallon, with sp. gr. of 2.50. Particle size determined the maximum settling rate at 20 FPM.

The wood tank used measured 7 ft. in diameter by 7 ft. straight side depth, with total capactiy of 1740 gallons. Operating level in the tank was 6' 6", giving a retention time of approximately 4.2 minutes and a batch of 1600 gallons.

SOLUTION: Analysis of the above factors led to selection of a Model ID-WQ-300 3 H.P. LIGHTNIN Top Entering Agitator, designed for open tank operation. The unit was equipped with a single 26-inch diameter 4-blade flat blade turbine, operating at 90 RPM. All wetted parts of the agitator were supplied in Type 304 Stainless.

Four vertical baffles, each 7 inches wide, were installed in the tank to give a flow pattern that would accomplish the desired results. Shaft length required on the mixer was 6' 4". MIXCO critical speed data indicated that satisfactory operation would be obtained without using a stabilizing ring or step bearing in the bottom of the tank, even though the mixer was to be operated while filling and drawing off.

A COMPLETE LINE . . . PLUS UNEXCELLED MIXING TECHNOLOGY

LIGHTNIN PORTABLE MIXERS
Electric or air motors; direct or gear drive. Capacities ⅛ to 3 H.P. Send for Catalog B-75.

LIGHTNIN SIDE ENTERING MIXERS
For tanks up to 5 million gallons capacity. Gear drive, Vee-belt drive, and motorless types. Send for Catalog B-76.

LIGHTNIN TOP ENTERING AGITATORS
Turbine, propeller or paddle type. For open or closed tanks. Capacities ¼ to 100 H.P. Send for Catalogs B-89, B-78.

LIGHTNIN Mixers and Agitators are used for feed water conditioning, stock chest agitation, clay slurry preparation, and wherever agitation is needed. MIXCO engineers have a 25-year backlog of experience . . . plus exclusive mixing data that enables us to predict process results accurately. Every installation is *guaranteed.* For help on any fluid agitation requirement, call your nearest MIXCO representative, or write direct.

MIXING EQUIPMENT CO., Inc.

(MIXCO)
1035 Garson Ave., Rochester 9, N. Y.

In Canada:
William and J. G. Greey, Ltd., Toronto

from 1946 to 1949 and on a special assignment at The Hague in Holland for the past year, has been appointed director of sales. Mr. Thouron has been associated with Hercules continuously since 1934, interrupting his service only to serve in the Army from 1940 to 1945.

New district sales manager of the Synthetic Department, B. H. Little, has been with the company since 1928, and the Synthetic Department since 1939.

Howard C. Bates, who has represented the department in New England since joining Hercules in 1941, is curtailing his activities in that area on the advice of his physicians, and will now serve as special sales representative for the area.

Board Elections at John A. Manning Paper Co.

In a recent election held by the board of directors of John A. Manning Paper Co., Green Island, N.Y., James F. Adams was re-elected president and general manager of the firm. Albert S. Loring, former second vice president, was chosen first vice president to succeed the late Francis E. Gallagher.

At the same elections, Roland Eustace, director of manufacturing, was elected second vice president while Arlie G. Smith was re-elected treasurer, comptroller and assistant secretary, and William H. Manning was re-elected secretary.

R. W. Shaver Leaves Gould Paper Co.

The resignation of R. W. Shaver, vice president and general manager of the Gould Paper Co., Lyons Falls, N.Y., has been announced by the Gould company owners, Continental Can Co., Inc.

Mr. Shaver succeeded the late Gordon H. P. Gould as president of Gould Paper Co. in 1945, and shortly thereafter negotiated the sale of the firm to Continental Can. During the last four years there has been a complete rehabilitation of the company properties.

Upon Mr. Shaver's resignation, John Sales, former manager of the Hopewell, Va., Paper Mill Division of Continental Can, was named general manager and vice president of the Gould mill.

Dr. Harry W. Gehm, technical advisor for the National Council for Stream Improvement, was named official representative of the pulp and paper industry on the National Task Committee on Industrial Wastes. This committee, formed under the auspices of the U. S. Public Health Service in Washington, will co-operate in an Industry-Federal Government approach to industrial water pollution control under provisions of U. S. Public Law No. 845.

Ray Smythe has been appointed West Coast agent for Sutherland Refiner Corp., Trenton, N.J., with offices at 501 Park Building, Portland, Ore.

R. M. Brown, at one time a sales engineer with Bristol Co. of Canada, Ltd., and more recently an instrumentation engineer with Stadler Hurter & Co., Montreal, has rejoined the Bristol firm. Mr. Brown will make Baltimore his headquarters.

George E. Williamson, president and chairman of the board of Strathmore Paper Co., West Springfield, Mass., was awarded the honorary degree of Doctor of Engineering at the 82nd commencement exercises of Worcester Polytechnic Institute last month in recognition of "his extraordinary administrative abilities, conspicuous leadership and devoted services to his alma mater. . . ." Mr. Williamson, who has

been associated with Strathmore since 1911, is a member of the executive committee of the American Paper and Pulp Association and is a past president of TAPPI.

A. G. Gibson, associated with Black-Clawson Co., Hamilton, Ohio, for the past thirteen years, has been named director of export engineering of the company's Export Department. Mr. Gibson, who formerly held the positions of sales and production engineer, and was in charge of product design and manufacturing facilities improvement at the Shartle division of the firm, will maintain offices at Middletown, Ohio.

Leonard J. Maguire has been appointed works manager of the scale plant of Fairbanks, Morse & Co., Chicago, located at St. Johnsbury, Vt. Mr. Maguire has been with the firm since 1929, and his most recent position was that of chief engineer of the St. Johnsbury plant.

Edward L. Norton, president of Coosa River Newsprint Co., Childersburg, Ala., has been named a member of the Board of Governors of the Federal Reserve System for a 14-year term dating from February 1, 1950.

Dr. Robert S. Aries, president of R. S. Aries & Associates, New York, flew to Europe July 5 to spend several weeks in a lecture study tour of Western Europe. In the course of his tour, Dr. Aries addressed several international conferences on food and chemurgy, industrial and chemical developments in the United States, and petroleum processing. In addition to lecturing to groups in France, Belgium, Western Germany, Sweden and England, Dr. Aries was able to confer with several European associates of his firm.

James W. Bennett has been appointed general sales manager of Penn Industrial Instrument Corp., Philadelphia. Mr. Bennett, who for the past five years has done special engineering sales work for Energy Control Co., New York, has devoted his entire business career to process and plant instrumentation since his graduation in 1939 from the University of Cincinnati.

George Berliant, chief industrial engineer for Stone Container Corp., Chicago, was one of 64 Chicago executives to complete the University of Chicago's sixth executive program held for three hours two evenings a week. Certificates were awarded those who completed the course covering such subjects as business accounting, personnel management, theory of management, statistics and marketing.

E. D. Beachler has been appointed chief engineer of Beloit Iron Works, Beloit, Wis. Other changes in the executive engineering staff were the appointments of *Lon Neese* and *Sterling Skinner* as assistant chief engineers.

Wendell D. Ray, a June graduate of the University of Indiana, has joined the industrial sales department of A. E. Staley Manufacturing Co., Decatur, Ill., as a price and market analyst.

Averill J. Wiley has been named technical director of the Sulphite Pulp Manufacturers' Research League, succeeding *J. M. Holderby,* who has joined the technical staff of Rhinelander Paper Co., Rhinelander, Wis. Concurrently, *Groff Collett* was named business manager of the League.

The Paper Industry Necrology

Samuel Foster

Forty years of service to the paper industry ended with the July 2nd passing of Samuel Foster, chief engineer of Kalamazoo Vegetable Parchment Co., Parchment, Mich. He began his papermaking career in 1910 with an apprenticeship course at International Paper Co., after graduation from the Mississippi State College and graduate work at Cornell University.

Samuel Foster

After working in increasingly responsible positions at International which culminated in the managership of the Rumford, Me., mill, Mr. Foster went to Union Bag and Paper Corp. in 1936. After two years at Union Bag he spent six years with Sandy Hill Iron & Brass Works, leaving to join KVP in 1944.

At KVP, Mr. Foster guided some of the firm's ambitious engineering projects, including the establishment of the Espanola and Appleford Paper Products Ltd. mills.

Survivors include the widow, two sons, and three daughters.

Lloyd Kitchel, a member of the board of directors of Hercules Powder Co., Wilmington, Del., and general manager of the firm's Virginia Cellulose Department, passed away June 30. Mr. Kitchel had been associatd with Hercules since 1926, when he joined its subsidiary, Virginia Cellulose Co., and became sales manager of the department when it was re-organized in 1929. He had been a director of the firm since 1937.

George W. Pressell

The oldest employee in service time at E. F. Houghton & Co., Philadelphia, George W. Pressell, passed away June 5 at Ocean City, N. J.

Mr. Pressell, who was 62, first became associated with Houghton 47 years ago when he accepted work as a messenger boy. In the intervening years, he became chief chemist, secretary, second vice president, general manager, and director of sales. Since 1919 he had been a member of the board of directors. At the time of his death, Mr. Pressell was a vice president of the Houghton firm and president of E. F. Houghton & Co. of Canada, Ltd.

The widow and two daughters survive.

Hector Murray, former superintendent of the West Ralston Paper Co. plant at Niagara Falls, N. Y., passed away in Spotswood, N. Y., July 16 at the age of 49. Mr. Murray had been associated with the West Ralston Paper Company for 20 years, moving to New Jersey two years ago when the firm closed its Niagara Falls plant.

Report of meeting on wood fiberboard at Braunschweig, Germany

THIS MEETING DEALT with boards made from wood waste and wood fiber and was held by the Deutsche Gesellschaft für Holzforschung (Oct., 1949) in Braunschweig.

W. Klauditz reported on research and progress in the production of such boards. Present day financial difficulties were stressed, and reference was made to the three types of board now manufactured in Germany: (a) that from groundwood, (b) that from a combination of groundwood and wood waste, and (c) that from wood waste ("Holzspan"). Somewhat over 118,000 tons are produced annually and it is hoped that production can be stepped up by another 72,000 tons. The properties of various types of board were discussed.

Dr. R. O. H. Runkel (of the Zentral Institut für Forst- und Holzwirtschaft in Reinbeck) presented a paper on known facts and problems in the system involving wood, water and heat. Heat (as is well known) caused fission of acetic acid and concomitant removal of hemicelluloses. Runkel discussed the Masonite, Asplund, and other processes (giving due credit to other investigators), which included the production of "Lignostone," "Staypak," "Stayboard," "Tronal," *et al.* Runkel treated all these processes from the standpoint of fundamental wood chemistry, indicating whenever possible what chemical changes had occurred.

Professor H. Winter outlined in his report the work on dimensional stability of plywood, fiberboard and wood waste board, discussing methods used for measuring dimensional and surface changes. Professor F. Kollman discussed standard nomenclature for materials made from wood and standard testing methods for fiberboard and wood waste board.

Dr. A. Dosoudil (Holztechnological Institute at Munich) extended the discussion to the *quality* of wood fiber boards and wood waste boards. The Stamper ("Fallwerk") used in making tests was described and methods for calculating the energy required for perforating a board were outlined.

Dr. H. Fahlbusch (Institut für Holzforschung in Braunschweig) reported on the "bearing strength" of flat structural materials made from fiber board as compared with that of plywood and wooden boards. A physicist, Mr. Brandt (of the Institut für Baustoffkunde und Materialprüfung, Braunschweig), reported on acoustic and heating properties of light structural materials.

An engineer, F. Fahrni (of Zürich) outlined in some detail a proposal for fiberboard classification. This speaker also showed a movie dealing with large scale production of Novopan boards. M. Himmelheber (of the Holig- Homogenholz-Werke, Baiersbronn) spoke on the research and development in the field of "homogeneous wood" [referring back to the pioneering work of Professor Schmid on "artificial wood," i.e., wood fibers treated with phenolic resins]. The properties of "porous wood" (Schaumholz), boards used in cabinet making, and hard boards were outlined. A forest assessor, J. Lohl, spoke on investigations required for the utilization of wood wastes in board production. Dr. I. Stolley described the protection of fiber and wood waste boards against fungal attack and illustrated her talk with lantern slides. Phenolic substances, if properly retained, serve to protect the products. Dr. H. J. Saechtling (Dynamit- A. G. in Troisdorf) discussed "Tronal boards" manufactured from sawdust. Industrial requirements of such boards were outlined, and binding agents are discussed. G. Hochel gave a survey of developments at Zenit-A.G. at Leut Kirch in the production of "Zefalon" boards from sawdust.

E. Ritter, chief engineer at Holztecknik, G.m.b.H. in Mainleus, spoke about materials formed from woodshavings and (more advantageously) from groundwood following impregnation with urea or phenolic resins and thermoplastic binders. Dr. W. Klauditz (at the end of the meeting) also gave a lecture on the current investigations carried out at the German Institute for Forest Products Research, showing the work in progress on the chemical composition of wood fibers, the suitability of the hardwoods (especially beechwood) for the production of fiberboard, etc., and fundamentals on the swelling and dimensional stability of boards made from wood waste (e.g., shavings). An interesting and spirited discussion followed the technical program. About 250 professionals attended the meeting. Reported by Franz Kollman, *Svensk Pappers Tidn.* 53, No. 4, 103-109. (1950) (In German).

Philippine News

The new paper mill and bag-making plant owned by the Philippine Government is producing paper at the daily rate of not more than 10 metric tons (1 metric ton = 2204.6 pounds). The mill, located at Mandaluyong, near Manila, has a theoretical daily capacity of 20 tons of paper, but power interruptions and other factors have kept production below this rate. Bag-making capacity of the plant is about 40,000 large-size multiwalled bags. Only imported pulp is being used in the mill.

The establishment of a pulp mill to supply the above-mentioned paper mill was approved by the National Economic Council late in October 1949. However, according to the Philippine Bureau of Forestry, the project is still only in the planning stage. Although no actual site has been selected, Albay Province was recently named as the most probable location. Raw materials for the pulp mill will consist principally of sawmill waste, bagasse, abaca waste, and other native fibers. A likely source of pulpwood is from second-growth timber.

A paper mill in Bais, Negros Oriental, was rehabilitated and began production about mid-1949. Production capacity is 15 tons of medium-grade bond paper and 10 tons of chip board daily. (From *Foreign Commerce Weekly*)

Australian Newspapers Form Buyers Company

Australian newspapers, representing an initial minimum of 70 per cent users of reel newsprint in the Commonwealth, have formed a buying company. It will have a working capital of about £1,000,000, underwritten by shareholders, all of whom are newspapers. The firm has already started to operate.

The new enterprise is a reorganization of Newspapers Supplies Pty. Ltd., with original shareholding reorganized, articles changed, and a new board elected. Existing shares have been surrendered and reallocated on a basis of consumption of newsprint annually; shareholding bears direct relation to newsprint consumption.

ECA Approves Modernization of Three Austrian Mills

Approval has been granted by the Economic Co-operation Administration for a program of modernization for three Austrian Pulp and Paper mills at a cost of $9,936,000.

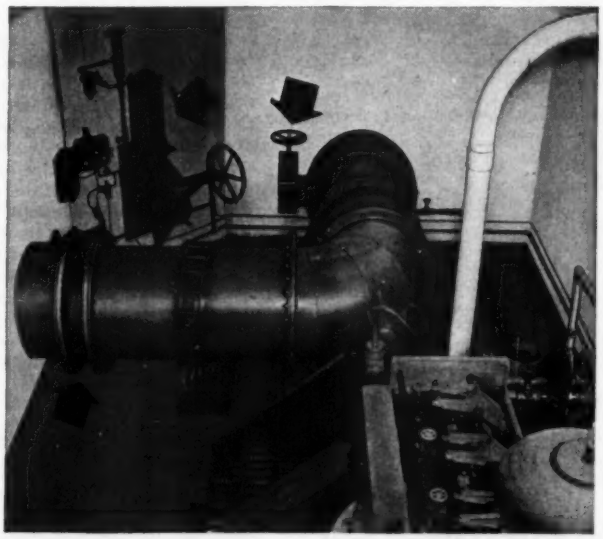
The first project is for modernization of two mills, one a fine paper mill at Andritz and the other a sulphite pulp mill at Rechberg, owned by Arland Papier und Zellstoffabriken A. G. After present obsolete equipment is replaced, paper production is expected to increase to 17,000 metric tons yearly from the present annual 8000 ton production, and wood pulp from 10,000 tons to 16,000 metric tons a year.

The replacement of two obsolete newsprint machines at Murtzaler Holzstoff und Papier Fabriks A. G., Bruck a. d. Mur, with one modern high-speed newsprint machine will increase the 1949 production of 12,500 tons to 30,000 tons in 1952.

Modernization of the integrated pulp and paper mill, Brigl und Burgmeister A. G. Zellulose & Papierfabriken at Niklasdorf,

R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •



TULSA WATER SUPPLY
Increased in Record Time

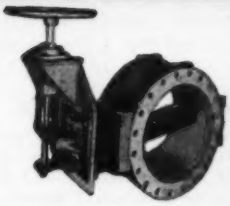
The City of Tulsa Water Department increased its water supply from twenty-four to minimum requirements of thirty-five million gallons a day without constructing a second gravity flow line. This was accomplished by means of booster stations at strategic points.

The fifteen R-S Valves supplied for this emergency operation ranged in size from 36-inch handwheel operated to 60-inch air cylinder operated with handwheel declutching units. After delivery, these valves were slipped into the line in a matter of hours. The entire project was completed in remarkably fast time.

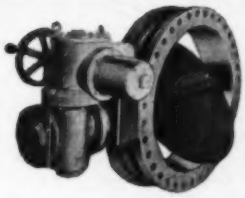
Due to an improvement in vane design, the flow rate in R-S Heavy Duty Valves (12-inch and larger) has been increased approximately 25% in the wide open (77½°) position. In case after case, the saving in pumping (or blower) costs will pay for an R-S Valve in short order based on "K" values alone.

Consult with your local R-S Valve Engineers. Look for the address and phone number listed under "R-S Products, Valves" or write direct.

R-S PRODUCTS CORPORATION
Wayne Junction • Philadelphia 44, Pa.

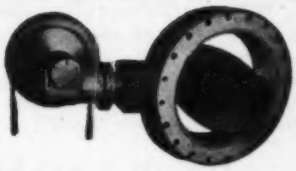


No. 700—20-inch 50-pound Cast Iron Valve with rubber seat, Type B-8934, for positive 100% shut-off. Heavy duty handwheel control with threaded reach rod. Type B-9469.



No. 724—42-inch 50-pound Heavy Service Valve, B-9813, complete with limiterque motor and gear reduction drive No. 4. Angular seating vane for wedge-type closure with metal seat. Rubber seat available if desired. Valve body good for 125 psi gauge static head and drip tight shut-off at 50 psi pressure drop with rubber seat.

No. 768—66-inch Fabricated Steel Handwheel Operated Valve with ends scrafted for welding. 6½-inch diameter one piece Stainless Steel shaft mounted on thrust bearings (valve installed with shaft vertical). Horizontal and vertical ribs on body prevent distortion when machining and assembling. Stuffing box easily repacked. Used to control river flow during dam construction. Open atmospheric discharge.



No. 737—20-inch 50-pound Heavy Service Valve (B9804) with rubber seat (B8934). Gear reduction drive No. 3 with chainwheel.

is the third project in the program. The proposed modernization is expected to increase chemical pulp capacity from 26,000 to 30,000 metric tons per year and paper manufacturing capacity from 10,000 to 18,000 tons a year.

Mexican Rayon Pulp Mill

Celanese Mexicana, S. A., and Viscosa Mexicana, two Mexican affiliates of Celanese Corp. of America, have announced plans for the construction of a $3,000,000 rayon pulp mill near Monterey, Mexico. The mill is expected to be in operation by the end of the year, and will have an annual production capacity of 9,000 tons.

Celanese Corp. in the United States is reported as not contemplating taking any of the output of the new Mexican mill. Rayon pulp supplies for Celanese are to come from its new $30,000,000 plant at Prince Rupert, B. C., scheduled to begin operations early next year. (From *Wall Street Journal*)

WHILE ON A TOUR of Tasmania recently, Premier McLarty of Western Australia discussed with the present managing director of Australian Paper Mills Ltd., Mr. Kessel, the possibility of utilizing Western Australian timber not needed for housing for paper production. Mr. Kessel, former Conservator of Forests in Western Australia, informed the Premier that even if timber, water and power could be provided, the cost of bleaching West Australian colored woods would make such a project impractical as compared to the woodlands of suitable light-colored timbers in Tasmania and other states.

INVESTIGATIONS have indicated the possibility that Ecuador could produce newsprint, wrapping, and writing paper from bagasse at prices lower than those paid for imported paper. It has been recommended that a paper mill be built to manufacture annually 3,500 tons of newsprint and 4,000 tons of fine and wrapping paper. Preliminary figures indicate that the total investment would be $1,780,000 U.S. currency. President Galo Plaza has indicated that an effort would be made to obtain a loan for this purpose from the International Bank for Reconstruction and Development. (From *Foreign Commerce Weekly.*)

LICENSES WERE TO BE issued by the government of India for the import of 10,000 long tons of newsprint from Canada during the period January-June 1950. According to the Ministry of Commerce notification on May 15, 1950, the licenses were to be issued according to four different categories of importers based on their past consumption. (From *Foreign Commerce Weekly*)

AN AMERICAN FIRM, Guy B. Panero, Engineers, New York, has been selected by Societa Generale Immobiliare to perform engineering services for one of the largest hotels to be constructed in Rome since the end of the recent war. Mechanical equipment for the 11-story building will be purchased in both the United States and Europe.

Foreign Abstracts . . . . . .

Beating of Kraft

With increasing temperatures, regardless of pulp quality, beating rates decrease. Temperature increases give rise also to changes in physical properties of the sheet, inasmuch as temperature changes are accompanied by differences in swelling of the pulp. Surface tension decreases with increasing temperature, with resulting decrease in swelling of the pulp fibers and a slower beating rate. This was shown both under laboratory and mill conditions. In either case power consumption increased; and cooling of the beating equipment is indicated. Strength properties of the paper sheet increases somewhat with lower beating temperatures. Erkki Tolvi *Paper and Timber* (Finland) (formerly the *Finnish Paper and Timber J.*) 32, No. 3, 65 (1950). (Original in Finnish; with English summary.)

Change in Status of the School of Papermaking at Grenoble, France

The author, who is Professor at the University of Grenoble, describes the effects of the change in rank of the Papermaking school to that of a National Upper Engineering College, thus giving greater prestige to future graduates. The famous School at Grenoble retains its name. Possible future courses for practical mill men (*e.g.* machine tenders, *et al*) are being discussed. M. Chene *Papeterie*, 72, 226-7, 229, 231, 233 (1950) (Original in French).

Ash and Flue Gases from Burning Sulphite Waste Liquors

In general, liquor with 50% dry solids or as dry powder, contains 5 to 8% lime, 5 to 8% total sulphur and 7 to 15% ash. These figures depend on the technique of neutralization and conditions preceding evaporation of the liquor. Ash analyses are given both when the sulphite waste liquor was burned alone, and when it was mixed with wood, and a method is given for determining the percentage carbon in the ash. Damages caused by ash and sulphur dioxide are discussed. In the case of sulphur dioxide this involves both corrosion in the mill and certain legal aspects associated with pollution of the atmosphere. Laboratory scale studies on scrubbing flue gases are reported. Experiments indicated that it was theoretically possible to absorb all the sulphur dioxide obtained from sulphite waste liquor by its own ash (assuming that oxidation is avoided). However, when the lime salts are oxidized to calcium sulphate, only about 50% of the generated sulphur dioxide is absorbed. Studies with an industrial flue-gas scrubber at a pulp mill which evaporates and burns its waste liquor showed that only 30% of the gas was absorbed, and that about 60% was converted into the sulphate. The discharged water (containing the ash substituents) was alkaline, and only 50% of its absorption capacity had been utilized.

The balancing advantages and disadvantages of a scrubber installation are discussed. Local demands for air-pollution improvement are also shown to be important, and it must be remembered that the scrubbers simply change the air-pollution problem into one of water pollution. The author gives 4 tables, 2 figures and 15 references. Axel Scholander. *Svensk Papperstidn.* 53, No. 2, 35-8 (1950) (Original in Swedish with an English summary).

Reactivity of Cellulose Pulps

Methods for determining the reactivity of pulps in water on acetylation and on xanthation are outlined in terms of the swelling value (S), the temperature rise (T) and the "insoluble fiber value" (F). For a sulphite pulp in water, the value (S) increases regularly with time, attaining an approximately constant maximum value after about 22 to 25 days (S) for an unbleached sulphite is less than for an unbleached kraft pulp, but in either case there is a progressive increase in (S) on delignification (by using increasing amounts of sodium chlorite). This relative increase attains a constant value in both cases. When a pulp is dried, (S) decreases especially when heat is used instead of air drying. (S) increases rapidly and progressively with Schopper-Riegler freeness. The relation between the (T) values and the acetylation reactivity of cotton linters and of rayon cellulose pulps was demonstrated. In the latter, this was true both before and after treatment with caustic soda. When the fiber residue (F) is high, operating difficulties during the xanthation may be expected. This is also true when there is a marked minimum in the ("filterabilty—F") curve, and also when an abnormal amount of hemicelluloses is present in the steeping liquor. Georg Jayme. *Das Papier* 1, 133-40 (1947); through *C.A.* 44, 5094h (1950).

Solubility of Cellulose in Organic Solvents

There is a lack of data in the literature on the solubility of cellulose in various organic solvents. A German patent (408,821) was studied with regard to the solution of cellulose in mixtures of pyridine and chloral, but not all cellulose preparations were found to be soluble. When a rayon pulp was first dissolved in cuprammonium hydroxide and reprecipitated and purified by electrodialysis, and the wash waters then replaced with pyridine, the product was soluble on the addition of chloral. However, this was not true in the case of the original pulp.

These differences are ascribed to differences in crystallinity. For example, when the regenerated pulp was dried, it no longer dissolved in the pyridine-chloral mixture. The above regeneration and replacement of water with pyridine was carried out with a cotton cellulose, but the resulting product did not dissolve in chloral. This insolubility is explained in terms of the greater average molecular magnitude of the cotton.

A number of other organic solvent mixtures (with quinoline as well as pyridine) were studied both with cotton and with regenerated pulps. The solubility behavior is given in tabulated form. The solution (when it occurs) appears to involve the preliminary formation of an addition compound between cellulose and one of the components (e.g. chloral), which then dissolves in the second solvent component (like pyridine). When cellulose is precipitated into methanol from such a pyridine-chloral solution, the precipitate holds bound chloral (*not* pyridine). Salts which in concentrated aqueous solutions dissolve cellulose, function better in pyridine or quinoline. Kurt H. Meyer, M. Studer, and A. J. A. Van der Wyk. *Monatshefte* 81, No. 1/2, 151 (1950) (Original in German).

Lubricating Oils from Tall Oil

This is a continuation of previous work abstracted in THE PAPER INDUSTRY AND PAPER WORLD 31, No. 5, 613 (1949). The present paper deals with the catalytic production of products from crude tall oil and tall oil pitch, and the apparatus used was evidently the same as that employed in the corresponding experiments with wood tar. Lubricating oils of comparatively high (and also low viscosities could be produced from crude tall oil (in yields of about 60%), by heating the tall oil with 1.5% iron powder or 3.5% ferric chloride for 1-6 hours at 300-320° C., distilling the product with superheated steam, and washing the distillate with caustic soda. Provided lime was added after heating with the catalyst but before distillation, the distillates were low in acidity (even after brief heating). This technique however, is non-essential and gives rise to certain technical difficulties.

The most advantgeous method involves the separation of the distillate into two main fractions. The lower boiling one freezes at about 15 degrees below zero (C) and its iodine number can be reduced from an initial 60 to about 5 by heating with Fullers earth. The higher boiling fraction freezes at about 5 degrees (above zero) and *its* iodine number can be lowered somewhat by means of aluminum chloride. The high freezing point may be lowered by the addition of Paraflow (a synthetic high molecular material prepared by Nobel-Standard) or by the use of certain Finnish substitutes, or, by cooling and centrifuging off (or filtering) the solid matter. The latter is composed chiefly of ketones (palmitone, oleone, and stearone). The catalytic method can also be applied to the production of lubricating oils from tall oil pitch. The author gives 8 tables, 2 figures and 13 references. T. Enkvist and S. Kahila. *Paper and Timber* (*Finland*) (Formerly the *Finnish Paper Timber J.*) 32, No. 1, 26-32 (1950). (Original in Swedish with English summary.)

Effect of Paper Fillers

The experiments deal with printing ink penetration, on the wire and felt sides of loaded papers. A sample of paper with basis weight 118 g. per sq. meter gave an average filler content of 23.6%. To gain data on the filler distribution, felt and wire sides of the sheet were scraped uniformly with a razor blade and the filler thus obtained from either side was weighed and ashed. Thus the felt side gave 26.7% and the wire side, 6.5% ash. The original furnish of the sheet consisted of about 20-30% hardwood pulp, 15-20% straw pulp; the remainder was spruce sulphite.

The penetration rate into this paper was measured by the Agahd tester (made by Karl Frank, Weinheim, Birkenau, Germany). This is an electrical instrument for measuring wettability of fibrous surfaces (and interiors), with the penetrating solution serving as electrolyte. The rate of penetration from contact of the lower side of the test sheet (placed under slight pressure between two electrodes) until the upper side is reached, may be recorded either by a stopwatch or by an automatic recording instrument. The apparatus has been used for testing the suitability of dissolving pulps for rayon manufacture, for testing genuine vegetable parchment, and for evaluating the filtration properties of filter papers. It has also served as an impregnation control (*e.g.* in artificial leathers).

Either side of the paper was tested for wettability with three solutions of differing viscosity corresponding to the range usually found in printing inks. The data indicate that the difference in penetration between the wire and felt sides of a test sample incrases with increasing viscosity of the electrolyte solution, thus confirming the behavior of printing inks. Anon. *Allg. Papier Rundschau* No. 15, 731 (Nov. 30, 1949). (Original in German); through *B. I. Paper Chemistry* 20, 650-51 (1950).

Flotation of Birch and Aspen Wood

These two wood species, in order to insure their utilization must be floated, and the author, after briefly reviewing the literature, describes his own experiments in Northern Sweden with various treatments to improve floatability of birch and aspen. With the former, the best results were obtained when the cut faces were impregnated after the tree was felled.

Logging requires a special technique. The tree is allowed to lie and season with its crown intact ("leaf-felling"). If the waterways are short and satisfactory, unbarked birch could be floated. Aspen requires a different treatment, and here the best results were obtained when the log was barked directly after felling and allowed to dry for some time prior to floating. These differences in behavior are discussed briefly. Nine diagrams are given. Georg Callin *Svensk Papperstidn.* 53, No. 3, 51-8 (1950). (Original in Swedish, with an English summary.)

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Convention Papers . . . Abridged

Wood room losses and their controls*

VANCE P. EDWARDES
Consultant

Management has paid far too little attention to wood, its species, quality, storage and the combined effect of these factors on the cost and quality of paper. Much less attention has been paid to wood room operations involving handling, barking, sawing, cleaning and chipping, and the resultant large wood losses, which occur far too often because of this neglect.

The first step in reducing wood waste resulting from barking was the development of barking drums of various types—batch, rotary and stationary. The average saving of wood over previous methods of knife barking easily amounts to 15 per cent.

The stationary type of barker eliminates brooming. It also has another advantage in its ability to handle 8-foot sticks. The wood loss in sawing 8-foot logs into 4-foot is about one-half per cent. With $30 wood, this saving amounts to better than 30 cents per ton of chemical pulp.

The Weyerhaeuser development of the whole log hydraulic barker is the most important and spectacular step that has been taken in years toward reducing wood room losses. Savings in wood with this barker have amounted to 18-20 per cent over the previous cut-up mill practice.

The development of the hydraulic barker for small round wood closely followed the Weyerhaeuser installation. In turn and shortly afterward, it was followed by a hydraulic slab barker.

The wood loss in the small hydraulic barker probably is close to 1½ per cent. This figure is an improvement over normal drum barking loss of 3-4 per cent.

While it is true that the place to start getting clean pulp is the wood room, much unnecessary cleaning still is being done by knife barkers, knot borers, wood peckers, beavers and knot saws. All of these machines have their place; but far too often they are not used intelligently.

Wood losses from the type of equipment just mentioned have been known to amount to 30 per cent. An over-all figure of 20 per cent is not uncommon. If, through proper supervision and without sacrificing cleanliness, this loss can be cut 50 per cent—there is a potential saving of $1.50 per cord of wood.

Some sulphite mills, which receive peeled wood and bleach all their pulp with three stages, have eliminated hand cleaning in the wood room. These mills depend on screening and bleaching to remove the dirt; operation emphasis should be on proper control and on the addition of auxiliary equipment, if that seems necessary.

Another factor closely connected with wood room losses is stream pollution from wastes of this type.

In a mill handling 500 cords a day, two-thirds of which is rough, the wood room loss, based on figures collected over a number of years, amounts to 2.5 per cent on peeled and 4 per cent on rough. This loss would be appreciably higher if there were not a sulphate mill, in addition to the sulphite, to take cull wood without cleaning. In this particular mill, the cull on spruce and balsam averages 4 per cent on peeled and 7 per cent on rough. The first mentioned losses, namely 2.5 per cent on peeled and 4 per cent on rough, are made up of sawdust, broomed ends, slivers and knife barker waste. The refuse from the barking and washing drums goes to a perforated scraper conveyor, the solids being delivered by it to a bark press and the water to sewer. The solids in the sewered water amount to 13,000 pounds a day of wood fines and 6,000 pounds a day of bark. In comparison, the fiber losses from the entire mill—pulp mills, bleach plant and paper mill—average 19,100 pounds a day. The seriousness of the problem can be seen from such comparative figures.

Naturally the quickest way to prevent the fines from reaching the river is to install screens. Most of the fines can be removed in this manner. Then they can be burned after pressing. Whether such an operation will pay for itself is questionable. At least it will greatly reduce the pollution load on the river.

The measurement and control of sawdust produced by the chipping operation is not difficult. Then, too, the reduction of losses from this source can result in real savings.

Dull knives increase sawdust by one-third. Therefore, the best knife definitely is the cheapest in the long run; and changing knives is better practice than filing.

The conditioning and adjustment of the bed-plate is often neglected. This neglect results in higher wood losses, both sawdust and slivers.

Sawdust measurement can be secured simply and cheaply by the installation of an automatic calibrated dumping bucket and counter. It can be homemade; or it can be purchased.

Sawdust remaining in the chips after the screens also must be determined if the correct figure for total sawdust produced is to be arrived at. A good average figure for total chipper sawdust is 2 per cent passing 0.128 inch mesh. Some operations produce less; but far more greatly exceed this figure. The industry-wide average for chipper sawdust must be at least 3.5 per cent.

A rapid method of chip analysis, particularly sawdust analysis, should be provided for the use of the chipper room foreman. Such a provision would make it unnecessary for him to wait for results from the control department, the figures of which usually are a day late anyhow. With the method available to him, he can check operations as often as desirable.

Much help can be gained by recording the quantity of sawdust produced on a graph. Such a graph makes it possible to watch trends—noting the effect of wood variations and the results of any changes made on the chipper itself, such as knives, face plates and bed plate, also chip length. Naturally, the shorter the chip, the more sawdust produced.

While the multiple-knife chipper is superior to the four-knife, it is no cure-all. Sawdust production is no less with it than that which can be secured with a four-knife in good condition and properly operated. Chip size, however, with the multiple-knife chipper is generally more uniform—less slivers and slugs. More uniform chips mean increased digester capacity, lower knotter re-

(*) Abridged from a paper read before the 31st annual convention of The American Pulp and Paper Mill Superintendents Association, Inc., held at the Edgewater Beach hotel, Chicago, June 8-10, 1950.

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jects, less tailings and labor, and less steam to bring the chips out of the bins.

In order for such savings to continue, a multiple-knife chipper must be maintained. It can not be installed and then forgotten or neglected because of other more important repairs elsewhere in the mill.

An appreciable improvement in chip quality and sawdust will result from operating a multiple-knife chipper at or near capacity. In a test run with such a chipper at 20 cords an hour, 1.5 per cent sawdust was produced. At 50 cords an hour, there was 1 per cent sawdust with less oversize and greater chip uniformity.

Some reduction in sawdust loss can be realized by re-screening the rejects of the chip screens and saving the pegs and toothpicks. This gain is particularly true if a large mesh is used on the sawdust tray or if a relatively large amount of hand cleaning is done. Either a rotary or shaker screen will be satisfactory for the secondary screening.

One unfortunate feature connected with most of the foregoing comment is the inability, in general, to prove savings in wood of say up to 5 per cent. So few mills are equipped with means of measuring wood into the wood room or even wood losses which occur to reveal this information. In fact, any savings made will not be reflected in pulp costs. They will show up only in the wood pile at the end of the season. Even though the operating staff will be sure of reduced losses, management still will be hard to convince. Operation, then, can take satisfaction only in a job well done.

Mill painting and its relation to mill maintenance*

O. F. SHOBE
The Glidden Co.

The painting of pulp and paper manufacturing plants requires a variety of materials to successfully protect them against the conditions encountered. Moisture, acid and alkaline solutions, and bleaching gases are the principal chemicals which the painted surfaces must withstand.

Fortunately, the paint industry today has a number of coating raw materials with chemical resistance properties unknown to the paint formulator only a few years ago. Techniques of successfully using some of the most resistant synthetic raw materials are a recent development not yet in general use.

Surface preparation The first important thing involved in any successful paint job is to provide a properly prepared surface over which to apply the material. There is no known way to provide renewed adhesion to a wall surface covered with an old film that has poor adhesion, and shows peeling and checking tendencies, other than to remove the coating and to prime the original surface. Walls and ceilings which have been painted time and again with old style porous water-thinned paints often present such surface. In such cases, complete removal of the old paint is necessary if a satisfactory repaint job is to be obtained.

No paint job over a badly rusted steel surface will stop the further spread of corrosion under the new film. There are products widely advertised to do this job, but practical tests indicate that it is necessary to remove the corrosion to sound metal, and to reprime if a good job is required. Where proper surface preparation is an impossibility, coatings designed to penetrate through the old film have their place as a stopgap.

Sandblasting is by far the best known method of removing corrosion from structural steel and tankage prior to priming and finishing. This technique is particularly good on new construction where there is no danger of product contamination or of damage to equipment.

Mill scale removal is of great importance on new construction. Corrosion usually gets a start on new steel during fabrication; and, unless removed, it will continue spreading under the mill scale after painting.

Loose mill scale cannot be removed satisfactorily except by sandblasting or flame-cleaning. If flame-cleaning is employed to do the work, thorough wire brushing should precede priming.

All surfaces prepared by sandblasting or flame-cleaning should be primed before new corrosion has a chance to start. Priming should be done the same day as the sandblasting or flame-cleaning.

In certain parts of a plant, where sand from sandblasting would contaminate the product or injure machinery, it is necessary to prepare the surfaces by wire brushing or

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by flame-cleaning. Chipping and scraping to loosen crusted rust should go hand-in-hand with mechanical wire brushing. A motor-driven wire brush often will fail to cut through crusted scales of rust unless some chipping is done to break up the corrosion. The proper use of a phosphoric acid wash before priming steel cleaned in this manner appears to have some merit. Here again all surfaces cleaned during a day's work should be primed the same day to prevent new corrosion getting started.

Wall surfaces The modern paper and pulp mill maintains the highest morale among its employees by a free use of color on walls and equipment. Pastel shades of proper color harmony not only guard against eye-strain and fatigue on the part of workmen, but also give good illumination. Low gloss on walls gives better diffusion of light. Also, where dull gloss finishes are applied, the walls are free from objectionable glare, and imperfections in surfaces are less prominent.

A wall and ceiling finish for certain departments of a pulp and paper mill must have excellent resistance to moisture and chemical penetration. Such a finish can be had by using a synthetic rubber type of emulsion paint. Available in a variety of colors, such a paint is applied easily by brush or spray gun on any wall or ceiling surface.

This new type of wall coating, without doubt, is one of the major advances of the paint industry. Quite unaffected by the alkalinity of properly cured plaster and masonry surfaces, it makes the use of a zinc sulphate or other neutralizing treatment unnecessary, in fact, undesirable.

The performance of a nationally advertised brand of synthettic rubber emulsion paint has been so phenomenal that millions of gallons of the material have been produced and sold. So outstanding have been and are the results obtained with this paint that it is revolutionizing interior wall painting. Obviously, such a coating would not be used on metal surfaces without the surfaces being primed previously with a suitable inhibitive primer.

A gloss finish usually is desired on plant dadoes. For this application, under severe conditions, a gloss Pliolite or chlorinated rubber enamel over the synthetic rubber emulsion paint sealer as an undercoat is highly satisfactory. The synthetic rubber base emulsion paint sealer may be applied to a wall not thoroughly dry from cleaning operations. Upon drying, the sealer will present a moisture-free surface for receiving the solvent type of gloss rubber enamels.

Gloss phenolic or alkyd enamels are also satisfactory for dado and trim coatings in any but the worst sections of the pulp mill. These enamels also may be used over synthetic rubber emulsion base paints as a sealer.

Structural steel and equipment surfaces The selection of the most successful painting system for such locations start with the priming coat. Primers protect steel surfaces by mechanical means, and also act as an inhibitor against electrolytic action. Under adverse conditions, a high order of protection can be secured only by a careful selection of primer vehicle compounded with pigments of known inhibitive properties.

If the surface preparation is such as to leave no pitted corrosion or other surface contamination, a vinyl system will give an order of protection against corrosion, both mechanical and inhibitive, that is second to none. The vinyl metal conditioning primer, vinyl anti-corrosive and vinyl finishing enamels built up to a film thickness of five mils will give years of protection against pulp mill corrosion.

Where a mutiple coat vinyl system is out of the question, and the surface being painted is subjected normally to severe corrosive conditions, a coat of rust inhibitive vinyl metal conditioning primer, followed by a high quality tung oil phenolic resin primer, will give much improved performance than a coating of tung oil phenolic primer alone applied directly on a clean steel surface. This vinyl metal conditioning primer dries in 15 to 20 minutes so there is little or no delay in putting on the succeeding coat. It also is an excellent primer on galvanized iron, stainless steel and other metal surfaces.

The primer in this vinyl system requires a surface quite free from corrosion scales and pits. However, it will take care of surface rust staining from wet sandblasting, and will adhere over a surface not entirely free from moisture. Fortunately, most types of dissimilar primers and finishing materials give splendid adhesion over this vinyl metal conditioning primer, and it adds greatly to their effectiveness when used as the metal conditioning first coat.

Because of the chemical conditions encountered in a paper mill, mechanical as well as inhibitive protection against corrosion is of great importance. For mechanical protection, the metallic surface subjected to corrosive conditions is isolated with films highly resistant to the passage of moisture and chemicals.

A high order of resistance usually is accomplished by using a primer vehicle containing twenty-five to thirty-three gallons of tung oil to one hundred pounds of a suitable phenolic resin. Also the necessary inhibitive pigments should be incorporated in such a vehicle so as to passivate the metal surface and stop electrolytic action.

Such a primer should contain a liberal percentage of red lead and lesser amounts of zinc chromate and zinc oxide pigments, supplemented by a good grade of iron oxide and inert extenders. This type of primer will be high enough in oil content to produce a tough, hard film of excellent performance if used on a well cleaned surface.

Where the effort has been made to carefully prepare a surface, two heavy coats of such a primer will be found to add proportionately to the life of a paint system over a single application of primer prior to finishing.

There are times and circumstances in mill maintenance where, for one reason or another, the complete removal of rust is out of the question and it is necessary to do a paint job over such a surface. To this type of surface preparation, the vinyl system does not have application. If a tung oil, phenolic resin primer is used, it must carry an appreciable percentage of linseed or refined sardine oil to aid in wetting the corrosion and other minute surface particles and incorporate them as a component part of the primer film. Such a primer should contain twenty to thirty per cent of raw linseed or sardine oil in the vehicle to accomplish this wetting action.

Another way to treat this type of surface is to apply a mixture of raw drying oils containing a small amount of a finely ground inhibitive pigment and a dehydrating solvent to the metal surface in a thin film. Then follow this oil coat in a few minutes with the tung oil, phenolic resin primer described for priming well cleaned surfaces.

The dehydrating and penetrating oil coat, when so used, will penetrate quite deeply into the corrosion remaining on the surface; the phenolic primer will form a highly resistant inhibitive coat over which to apply the finishing coats.

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mill, a solvent type of rubber resin enamel is known to perform well over such priming coats as have been described. Chlorinated rubber resin enamels have the same order of resistance to paper mill conditions. Phenolic resin tung oil enamels of vehicle composition similar to the phenolic primer vehicle already described have splendid resistance to paper mill chemicals, but are probably not equal to the solvent type rubber resin enamels in the worst areas. All of these enamels, as well as the vinyl materials to which reference has been made, are to be had in a wide variety of pastel and deep colors for machinery and equipment. Therefore, the paint manufacturer should be asked to supply materials conforming to a standard color scheme that will present an attractive appearance as well as afford protection to the surface painted.

In the long run, the painting of a pulp and paper mill can be done most cheaply by utilizing the highest quality materials that can be designed for the conditions. The cost of preparing the surface is so great that the paint cost for the job is a small part of the bill. A technically correct system of cleaning and painting for the conditions involved is likely to pay off by giving several times the service life of a poorly prepared surface painted with a badly formulated product.

It is appropriate to call to the attention of the superintendents and plant engineers present that every important and up-to-date paint company including the one I represent maintains a staff of skilled engineers available to be called in for consultation on all important industrial maintenance problems.

A complex painting system, such as is necessary for proper mill painting, must be studied with the relationship of one coat to another. Painting costs will be held to a minimum if the products of one manufacturer are used throughout a department or mill. This practice eliminates any possibility of a difference in compatibility, adhesion, toughness, etc., of one product as compared to another.

Industrial injury control as it applies to the superintendents*

DALLAS E. HENRY
Safety Co-ordinator
Southern Advance Bag & Paper Co.

The pulp and paper industry is the sixth largest industry in the nation. Its injury rate is twenty-sixth out of forty major industries and 31% above the average for the forty. From these statistics, speaking of the industry as a whole, it is seen that the rate of the industry is bad by any comparison. There are some individual mills, however, that operate year after year without injuries.

The average compensation, medical and insurance cost of each industrial injury last year was $559.00 according to the National Safety Council. This figure does not include the down time caring for the injured worker, making repairs to equipment that accompanies some injuries, or replacing the injured worker. The total injury cost usually runs from four to five times the compensation and medical charge. The mill with an injury cost based on these figures, of less than one dollar per ton of paper produced, has an excellent record.

During the war, the United States Department of Labor, through its Bureau of Labor Statistics, set up an injury prevention program under the slogan, "Conserve Manpower for the War Effort." The aim was a 40% reduction in injuries in industries with high accident rates. Among these industries was pulp and paper. This program was successful not because of the Bureau of Labor Statistics, but because of the action of the managements of the pulp and paper mills.

Industrial injuries are not accidents. They are the result of mistakes. Webster's definition of an accident is anything occurring unexpectedly, undesignedly or without known or assignable cause.

If our injuries were the result of faulty design and equipment, a plant twenty years old would have a much poorer record than a modern plant. To the contrary, some of the older plants have much better records than do the newest and most modern ones.

If we analyze a group of industrial injuries, we will find that each of them contain three characteristics—motion, contact and a mistake on the part of someone. The motion and contact is between men and men, men and machinery, and men and material. If motion and contact is eliminated in our plants, we will eliminate the injuries. We also will eliminate production for without motion and contact, no paper or pulp can be made.

An injured worker is a symbol of a failure on the part of supervision in the department. (*Concluded on page* 538)

(*) Abridged from paper presented before the meeting of the Southern Division of the American Pulp and Paper Mill Superintendents Association, Inc., held at the Hotel Frances, Monroe, La., Oct. 24-26, 1949.

The Paper Industry New Products

Paper Tensiometer

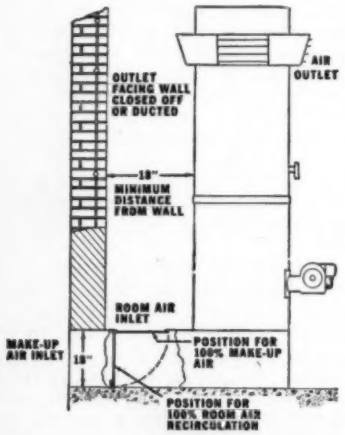
Accurate control of paper tension during manufacturing and reeling operations.

The tensiometer can be connected to electronic controls of paper machinery, so as to adjust the machinery automatically, maintaining whatever paper tension the operator may require. It consists of a small steel roller, mounted on ball bearings, which rides on top of the moving paper, mounted so that a slight "dimple" is depressed in the sheet. Changes in paper tension shift the roller's position a slight fraction of an inch, which provides an electrical signal for measurement or control purposes.

The roller is fixed at the end of an arm, which bends as a roller rises or falls. Bending of the arm is measured by an electric device known as a "strain gauge" which is connected in turn to electronic controls of the paper machinery. Any change in position of the roller instantly causes the machinery to adjust itself in order to restore the desired tension. General Electric Co., Schenectady 5, N. Y.

Electronic Control

Sensitive to temperature changes as small as 1/10 of a degree.



It is claimed that this device will control industrial processing temperatures in which the temperature range is between 20 deg. below zero and 300 deg. above. The control is immune to vibration, dust, and dampness, and where both control and a record is required, may be used with indicating or recording instruments made by this company. Minneapolis-Honeywell Regulator Co., Wayne and Roberts Aves., Philadelphia 44, Pa.

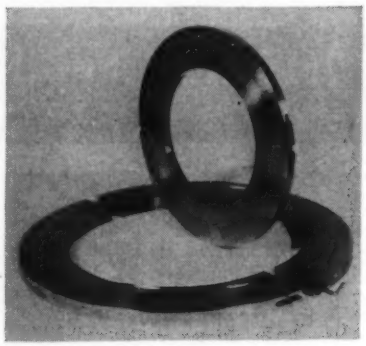
Swivel Pipe

Free from bolted flanges, threaded sleeves, locking rings and keys.

An all-flex ball bearing swivel pipe handles conveying of fluids under high pressure, and swivels or rotates a full 360 degrees in all planes. It is designed for an average speed of rotation not to exceed 60 rpm. and consists of two packages, each being comprised of a "T" shaped metal backer to which a pair of synthetic rubber lips are vulcanized and bonded. Each backer functions in its own individual chamber. High pressure swivel pipe couplings are made of steel. Low pressure couplings are made of aluminum, bronze, malleable iron or steel. Gil-Lair Products, Inc., 81 Masonic Court, Pasadena 3, Calif.

Split Thrust Washer

Designed to facilitate repair.



Dismantling your machine to install new bearings is not necessary with replacement split washers available. Washers are simply slipped over the shaft and locked with the safety key. Especially designed for heavy construction machinery (shovels, cranes), plant machinery, conveyors, lift trucks, power house and other large electrical installations, or any job using thrust washers. Washers are made of a combination of a high percentage of pure copper, pure tin and pure lead with a maximum of .2% impurities. Saginaw Bearing Co., 821 S. Water St., Saginaw, Mich.

Vertical Turbine Pump

Uses glass-lined bowls and bronze impellers.

It is claimed that this pump, named "Watermaster," is adaptable to deep wells as small as 4 inches in dia. and has up to 40% more capacity than the average pump in its class, delivering 15 to 115 gpm, and under certain conditions 140 gpm or more.

An oversize foot valve which holds water in the column at all times assures instant, positive lubrication of all bearings and shaft journals. The valve face is rubber lined and mounted in an inclined position to prevent sticking or clogging in the presence of sand. The large area inclined valve face prevents sticking during critical starting periods.

This pump was developed for small community water systems, industrial plants, ranches or truck farms and is easy to install, particularly in locations where there is limited overhead room. A. O. Smith Corp., Houston, Tex.

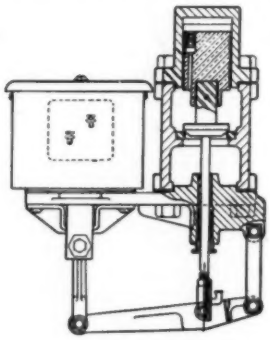
Synthesizing Unit

May be used for oil-bodying and manufacturing synthetic resins of all types.

The package-type direct-fired synthesizing unit consists of a 1000 gal. gross-capacity agitated synthesizing kettle, complete with a 2000 gal. gross-capacity jacketed and agitated cooling and thinning or reducing tank. Kettle is equipped with automatic and recording oil burners, and a reflux condenser that is jointly used in synthesizing formulations during reacting or thinning after final processing. Unit is also adapted to many types of polymerization, refining, processing and distillation, and other functions required in the preparation of organic or inorganic products. The Patterson Foundry & Machine Co., East Liverpool, Ohio.

Solenoid Valve

Features dash pot to end water hammer.



Series No. 4000 is designed for normally closed operation, slowing down the closing action of the valve 1½ to 2 sec. Construction of dash pot consists of a bronze piston fitted within the top housing of the valve, and pinned to the valve to follow its movement. Upward seating ball check controls the flow through a port in this piston. This valve is built for heavy duty service, and handles temperatures up to 400 F. Smaller sizes will operate under differential pressures up to 150 lb. Available in ¾, 1, 1¼, 1½ and 2 in. sizes. Johnson Corp., Three Rivers, Mich.

Synthetic Waxes

Range in melting point from 133 F. to 285 F.

Products of the amide and ester types, these synthetic waxes are light colored, hard,

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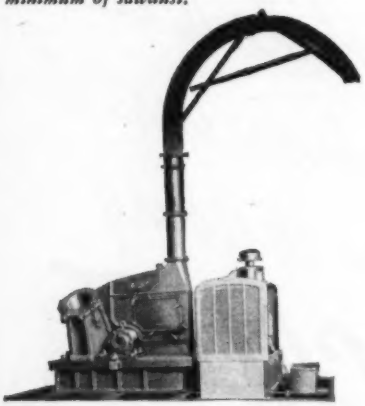
non-tacky, and range from water-insoluble and, in a number of cases, even solvent insolubility to water dispersible and solvent-soluble. They may be used as lubricants, coatings, detackifiers, flatting agents, etc., in plastic, rubber, paint, textile, paper, and other industries. Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N.Y.

Portable Wood Chipper

Eliminates waste . . . uniform chips with minimum of sawdust.

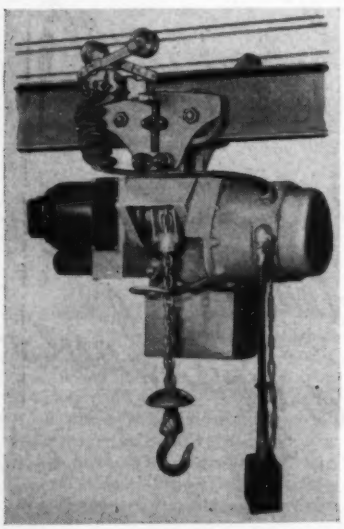


Small trees, limbs, branches, etc., may be converted into usable chips with the new MURCO Portable Wood Chipper which has the same principles of design and operation as the MURCO chipper which has long been used in many pulp mills.

The capacity varies from 15-20 cords per hour depending on size and kind of wood; it is designed for lowest power consumption commensurate with results to be obtained. It is furnished either skid or trailer mounted. The operation cost is low and chips are produced with a minimum of sawdust. D. J. Murray Mfg. Co., Wausau, Wis.

Electric Hoist

Has lifting speeds up to 41 fpm.



New performance features of the chain-type Load King electric hoist include a lower as well as an upper limit stop, and a wide pickup angle. Principal distinction is that link chain, over an electrically-driven sheave, supports the load. This permits extra long lifting lengths since wound-up chain does not wrap around a drum but collects in a metal container as the hook raises. The hoist hook can reach out as far as 30 deg. from the vertical to pick up loads, and the limit stops prevent over-travel of the hook when lifting or lowering. Available in load capacities of 500, 1000 and 1500 lb. Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia 15, Pa.

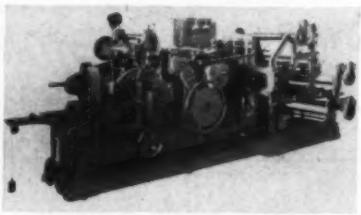
Two Stage Pump

Embodies many modern features of multi-stage design and engineering.

Offers such features as water-cooled, duplex, angular contact ball thrust bearing, labyrinth type seal, heavy, horizontally split casing with flanged bearing supports, and inter-stage seal against by-passing. Only suction pressure on both stuffing boxes, renewable protective shaft sleeve, and hydraulically balanced, back to back impellers, are other factors said to assure efficient operation, long life and low maintenance cost with the Type TL two-stage pump. Warren Steam Pump Co., Inc., Warren, Mass.

Bag Machine

Produces a smooth cut-off while preserving the lip-type bag construction.



Model 111S cellophane bag machine converts pasted single-wall or duplex bags, flat and square, from 2 x 6½ in. up to 10½ x 16½ in. at speeds ranging from 100 to 300 bags per minute. Included in the many new developments of this machine are the cutter knives that cut against a cam-actuated reciprocating anvil, permitting the matching of the cutting speed with the tube speed for any given tube length; a longitudinal shaft which provides a synchronized drive to various components of the machine, thus reducing adjusting time; and a unique pneumatic counter which speeds up the packing operation.

Other important features are the compensator and electric eye for converting preprinted paper, aniline press drive, vertical stack-up delivery, and a bottom forming drum mounted on a rack-back carriage to permit ease of adjustment for various tube lengths. Potdevin Machine Co., 1246 38th St., Brooklyn, N. Y.

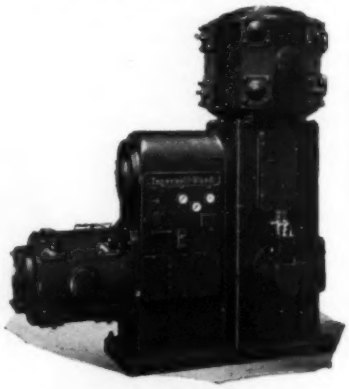
Ion-Exchange Unit

Uses amberlites in mixed bed; meter shows output quality.

Water which is virtually free from ionized impurities can now be produced by the mixed-bed technique of ion exchange operated in a miniature exchange unit which weighs 5½ lb. and requires one-third of a square foot of bench space. The apparatus yields up to 5 gph. of water equal in chemical quality to that which is triple-distilled. Fed with ordinary tap water, it can deliver a product with an electrical resistance of 10 million ohms., containing only one part of ionic solids per 100 million parts of water. Crystal Research Laboratories, Inc., Hartford, Conn.

Air Compressor

"Pipeless, thru-frame air flow."



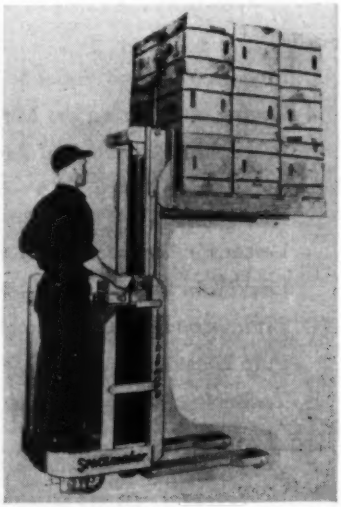
Packaged-type, heavy-duty electric-driven compressors in a size range of 125 to 350 hp for continuous full-load service and two-stage compression to 80-125 psi discharge pressures.

Designated as the XLE, the design embodies a single vertical low-pressure compressor cylinder, a horizontal high-pressure cylinder, and a synchronous motor mounted directly on the crankshaft. There is no inter-stage piping nor cylinder strain due to air piping.

The compressor is particularly suitable wherever skid-mounting, factory floor, or ground conditions require a well-balanced machine. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Electric Tiering Truck

Narrows aisles . . . Increases floor space.



The SpaceMaker, claimed to be the lightest, shortest, and most maneuverable powered tiering truck now on the market, makes possible the tiering of skid and pallet loads

Federated first for Lead Products

Asarco Sheet Lead ... All commercial weights and sizes. Chemical ... Tellurium Chemical ... Antimonial.

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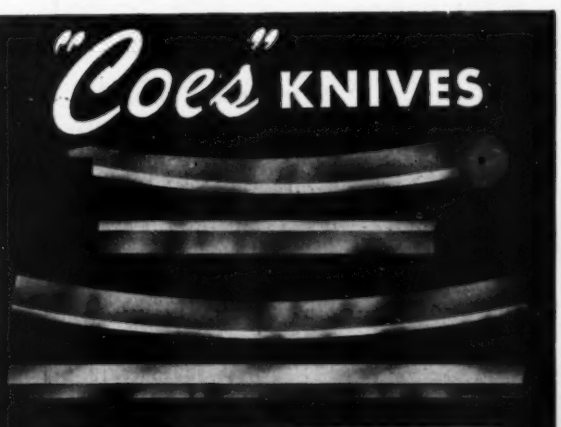

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For finer, longer lasting cutting edges than you thought possible—by the most rugged machine in its range—up to 120" and longer!

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COVEL SAW SHARPENERS HANCHETT KNIFE GRINDERS

HANCHETT MANUFACTURING CO. MAIN OFFICE—BIG RAPIDS, MICH. WEST COAST—PORTLAND, ORE.

WORLD'S LARGEST MANUFACTURERS OF SAW SHARPENING AND KNIFE GRINDING MACHINERY

in areas where a larger truck would be unusable. The manufacturer cites a warehouse where 24 in. x 36 in. box skids were right angle tiered from a five-foot aisle as an example of the versatility of the truck. The result of several years of research and experimentation, the SpaceMaker is presently available in three types: platform, for tiering skids; fork, for tiering single-face pallets; and straddle, for tiering two-faced pallets. LYON-Raymond Corp., 8066 Madison St., Greene, N. Y.

Monorail System

For economical overhead handling of lighter loads or shorter spans.

The "T-Beam" Trambeam is interconnectable with conventional Trambeam and offers advantages of the heavier systems. It consists of one-piece rail section, made of high carbon steel to provide extra strength without extra weight. The rail and its hangers are flexibly suspended to eliminate torsion on the hanger rods and to equalize wheel loads. Whiting Corp., Harvey, Ill.

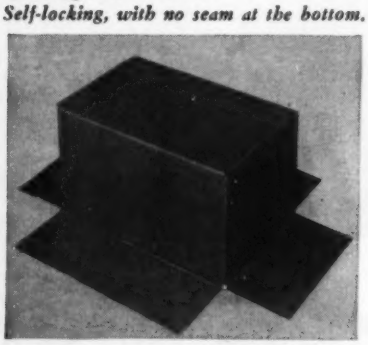
Steam Turbines

Have close coupled, integral reduction gears for low speeds.

Equipment such as pumps, fans, compressors, and generators can be driven at their proper speeds by the Gearturbines while the turbines operate at their most efficient speed. The units combine a rugged, compact speed reduction mechanism solidly coupled to the Type E turbine and designed to operate as a single unit. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Corrugated Carton

Self-locking, with no seam at the bottom.



No tape, glue or stapling is required to close the bottom of the Shellock carton, for it is folded into a rigid box with double thickness of corrugation at the bottom and sides. Exceptional strength is imparted at the bottom due to the lack of a seam, and the carton, knocked down, does not occupy any more storage space than the conventional carton. Shelton Mfg. Co., Inc., 42-24 Orchard St., Long Island City 1, N. Y.

Humidity and Temperature Instrument

Tells the relative humidity and temperature at a glance.

The humidity scale on this instrument, known as the Hygrodial, is graduated into 10 equal divisions from 0 to 100 per cent over an area of 2½ inches and is plainly marked. The thermometer is a red liquid filled, lens front type accurate to within 1 deg. at 70 F. Both sets of numerals are satin-finished aluminum on an etched black background, and afford a clear quick reading.

Humidity sensing element is composed of 216 in. of fine blond human hair, which, according to the production engineers, is the most sensitive to changes in the atmospheric moisture content. The Abbeon Supply Company, 58-10 41st Drive, Woodside, New York, N. Y.

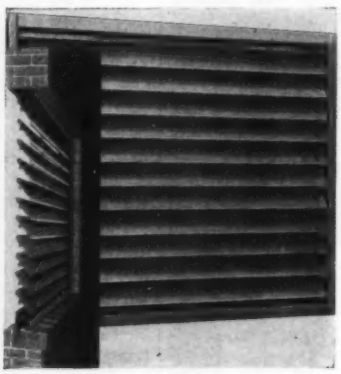
Heavy Duty Valves

May be cleaned without removing from the line.

Designed primarily for pipe lines and equipment handling such materials as paper pulp, thick or heavy chemicals, slurries, sludges, dust and scale or gases containing a high percentage of solid particles, the valves provide full flow for line pressures to 100 psi. Units have cast iron bodies with steel blades; bronze bodies with brass or stainless steel blades and bodies can be supplied, where needed. Careful machining of the blade recess and the blade to close tolerances reduces leakage to a minimum. W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn.

Louvers

Weather-proof in both open and closed positions.



Industrial and commercial building louvers have heavy duty frames and overlapping blades, fabricated under a flexible setup permitting almost unlimited selection of sizes. Maximum dimensions for a single unit are 74¾ in. x 48 in., with sizes as small as 11⅞ in. high and 12 in. wide obtainable. By varying the number of blades used, and cutting the frames to suit width requirements, any size wall opening can be fitted with a pattern of equal-size units. Made in adjustable and fixed types. The Swartwout Co., 18511 Euclid Ave., Cleveland 12, Ohio.

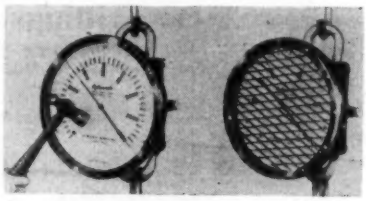
Rubber Seated Valves

Drip tight up to plus 275 F.

Where positive shut-off is necessary, specially compounded rubber seats are provided for these valves which are drip tight with water at 100 psig. and air bubble tight at 80 psig. under temperatures up to plus 275 F. and as low as minus 40 F. Rubber seat is replaceable. Valves can be operated individually, in unison, or adapted to automatic control. Used for mixing purposes, reversing valve on condenser water and other applications. R-S Products Corp., Wayne Junction, Philadelphia 44, Pa.

Dial Glass

Resistant to blows and heat and will bend without breaking.



A new impact-resistant, special tempered dial glass that eliminates the need for protective metal guards has recently been announced. This new glass is up to five times as strong as plate glass of equal thickness yet will bend as much as twenty degrees without breaking. It will also absorb a thermal shock of 500 degrees without breaking or distorting. The core of this dial glass is relatively soft and its exterior surfaces are extremely hard. Hydroway Scale, Inc., 20624 W. Eight Mile Road., Detroit 19, Mich.

New Product Briefs . . .

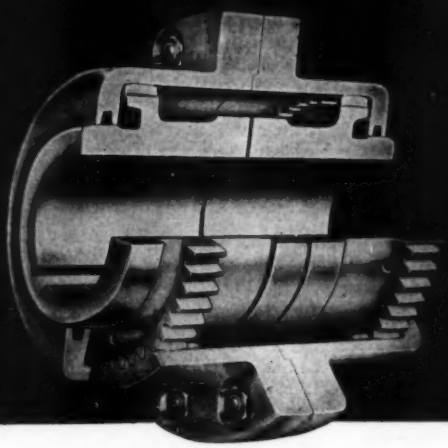
▸ CHEMICAL RESISTANT FABRIC—Provides greater resistance to a wider range of chemical hazards, including—with special preparation of the compound—resistance to anhydrous hydrogen fluoride. With the compound it is possible to completely seal over garment seams and prevent chemical seepage. The fabric is claimed to be 40% lighter than the ordinary impervious fabric and extremely flexible. Standard Safety Equipment Co., 232 W. Ontario St., Chicago 10, Ill.

▸ SPEED CHANGERS—Zero backlash in the miniature speed changers is obtained by the use of a torsional spring and 2 parallel gear trains built into each gear section. One gear train is spring loaded against the other so that backlash is taken up continuously. Ideal for controllers, registers, computers, and servomechanisms. Available in more than 500 different ratios. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.

▸ GEAR HEAD ELECTRIC MOTORS—Include such features as weatherproof design, higher efficiency due to an integrally built unit with helical gears, the Herringbone rotor, liberal heavyduty ball bearings lubricated for life, and versatile mounting. Sterling Electric Motors, Inc., Los Angeles 22, Calif.

▸ VARIABLE SPEED COMBINATION SHEAVES—Cover a wide range of speed and load ca-

POOLE



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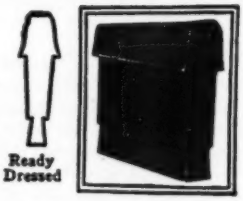

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Spots before your eyes...

"THE BAUER STORY OF DIRT DISPERSION"

One way to reduce the visibility of dirt is by attenuating it, as is done in some drycleaning establishments; probably also in laundering by the rinseless method!

The Bauer Pulp Refiner is a splendid machine for diffusing the dirt in paper stock. First, the vigorous beating action disintegrates all friable inclusions such as pieces of bark, pitch, shiners, shives, or clots of pulp. Second, the centrifugal action of the disks disperses the minute particles throughout the mass of stock. Thus the better formed finished tissue, paper, or board is virtually clean and dirt free.

This problem of dispersion is so interesting and important that our engineers have written a paper to tell you how the Bauer Pulp Refiner fits into the subject. Results of laboratory tests and mill experiences are cited.

You'll want a copy if you are troubled with formation or dirt troubles—or if you are meeting the problem with relatively cumbersome and expensive methods.

The disintegration and dispersion of dirt is incidental to the total behavior of Bauer Pulp Refiners. So far as we know, no one ever bought these machines expressly for dirt diffusion, but rather to obtain the over-all advantages of better and more economical pulp processing and/or stock refining. *Anyway, ask us to send you the treatise.* No obligation, of course.

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3. Weighing only about one half as much per cubic foot as other types of filter media ANTHRAFILT backwashes at lower rates.

4. Being essentially a carbon you can filter sanitary supplies, hot or cold process water or acid and alkaline solutions.

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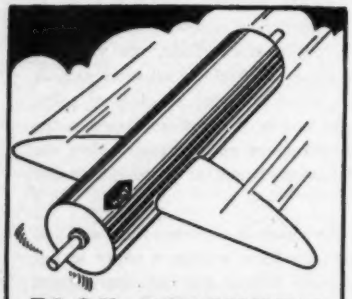

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▸ VACUUM PAN DRIER—"Standard-Plus" vacuum pan drier is for the recovery of dry solids by the evaporation of solutions or slurries. All parts of the unit in contact with the contents of the vessel are of stainless steel type 316. Industrial Process Engineers, 8 Lister Ave., Newark 5, N.J.

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▸ TOOLMAKER'S HAMMER—is proving handy for backtenders and others who have occasion to test rolls of paper for resiliency and for soft spots. Pocket size Hammer weighs 4 oz., has both flat and ball peen heads and is nicely balanced. Additional feature is a highpower magnifying lens built into the head where it is always available for checking texture, finish, defects and making other inspections usually performed while testing rolls for soundness. L. S. Starrett Co., Athol, Mass.

Industrial Injury Control . . .

(Continued from page 531)

There are several steps a superintendent may take to control the injuries in his department. The first step, I believe, is that he must believe they can be controlled. An examination of the National Safety Council's Accident Facts, or the yearly report of the Southern Pulp and Paper Safety Association, will convince the most skeptical.

The next logical step is to work out a plan. The plan may include safety committees, inspection committees, or a combination of both. These committees may consist of foremen or workers or both. No matter who they are, or what they are called, they should report to the superintendent.

Another good plan is to review the injury rate at departmental production meetings. In fact, any plan that works is good.

The plan that works best is the plan that lets every worker in the department know that the *superintendent* wants injuries eliminated, because he desires it, and not someone outside the department.

(A representative of one of the largest southern mills was asked recently what single factor had contributed most to the reduced injury rate in his mill. His answer was that the boss had called all department heads together at the first of the year and told them that he wanted the rate lowered.)

The plan should include an analysis of each operation in the department. Where hazards are found, steps should be taken immediately to eliminate, minimize or control them.

The analysis of each operation in a department is too great a task for one person. It may be accomplished by having the safety man train the foreman and help him make the analysis. It may be done by having every worker analyze his own job, using a prepared check sheet.

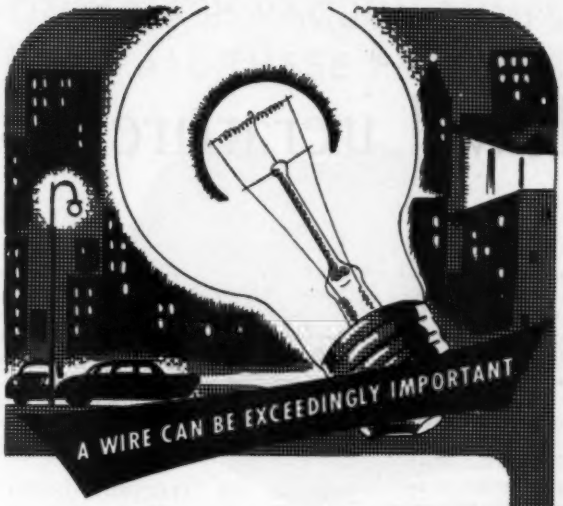
The superintendent may ask the safety man to make an analysis of the operations that are producing the most minor injuries. The safety man should be used by the superintendent the same way that he uses the services of the engineering department, the laboratory, the maintenance department, or any other service department.

Requiring a report of every first-aid injury is another means the superintendent has of reducing the injuries in his department. The report should be made out by the injured worker's immediate supervisor and sent up through supervision to the superintendent, every foreman or supervisor initialing it.

A study made by Heinrich, one of the world's foremost authorities on safety, of thousands of industrial injuries, revealed that a worker will do the same unsafe act an average of three hundred thirty times before he is injured severely enough to lose time from work. He also found that the worker will be injured twenty-nine times out of the three hundred thirty enough to be given first aid.

These statistics show that the superintendent requiring a report on each first-aid injury has a chance to correct unsafe practices before they produce injuries. He also will be able to increase the efficiency of his department because he will become acquainted with more errors of judgment than he thought existed. By these actions, the superintendent will make injury control as much a part of his operations as quantity and quality of paper.

The injury rate of the pulp and paper industry is not equal to its production record in comparison to other major industries. We need to control our injuries so that we will fulfill an obligation to our workers, stockholders, and the communities in which our plants are located. These injuries may be controlled by supervision—exercising the same degree of control over the actions of the workers that is exercised over the machines they operate.



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The Paper Industry New Literature

Books

HANDBOOK OF MATERIAL HANDLING WITH INDUSTRIAL TRUCKS. Published by the Electric Industrial Truck Association, 3701 No. Broad St., Philadelphia. 8½ x 11. 72 pages. $1.00; quantity prices on application, complimentary copies to executive officials or collegiate deans and professors.

This volume, said to be entirely new in text, illustration, charts and diagrams, supplants the sixth edition of the earlier volume of the same title. The book is a practical guide to the analysis of material handling operations and the application of the unit-load method for power-operated industrial trucks. Material is presented in four sections, each of which is extensively illustrated with diagrams and actual pictures of industrial trucks in operation in a variety of industries.

Section 1, titled the "Evaluation of Industrial Truck Handling," discusses the advantages in efficient and economical handling of materials by industrial truck; section 2, identified as "Material Handling Management," discusses in several sub-sections such subjects as the preparation and use of flow process charts, commodity and capacity factors of trucks, and the use of unit loads in storage; section 3 outlines an efficient "Organization of an Industrial Truck System" which is applicable to the paper and converting industries; the final section is concerned with "Practical Truck Engineering," gives many helpful suggestions for truck maintenance.

The volume concludes with a bibliography of trade publication articles on this subject and an appendix of the average density of many common materials.

CHEMICAL ENGINEERS' HANDBOOK. Edited by John H. Perry. Published by McGraw-Hill Book Co., Inc., New York. 7½ x 10. 1942 pages. $15.00 (Textbook Edition $12.50.

The thoroughly revised and expanded third edition of the Handbook is set in a larger page size than the second edition, and is more valuable than ever to the chemical engineer. It is now a bulkier volume to handle, but the format is a readable double-column page with larger graphs and drawings, and the information is up to date, containing many wartime developments. One hundred and forty specialists assisted editor John H. Perry, of E. I. du Pont de Nemours and Co., in the preparation of the Handbook.

Thirty thumb-indexed sections replace twenty-nine in the old edition, and cover a wide range of theoretical and practical information. Following are the section titles: Mathematical Tables and Weights and Measures; Mathematics; Physical and Chemical Data; Physical and Chemical Principles; Flow of Fluids; Heat Transmission; Evaporation; General Theory of Diffusional Operations; Distillation and Sublimation; Gas Absorption; Solvent Extraction and Dialysis; Humidification; Dehumidification, and Cooling Towers and Spray Ponds; Drying; Adsorption; Mechanical Separations; Size Reduction and Size Enlargement; Mixing of Material; High-pressure Technique; Process Control; Movement and Storage of Materials; Materials of Construction; Fuels; Furnace and Kilns; Power Generation and Mechanical Power Transmission; Refrigeration; Plant Location; Electricity and Electrical Engineering; Electrochemistry; Accounting and Cost Finding; Safety and Fire Protection.

TECHNIQUES OF PLANT MAINTENANCE—1950. Parts 1 and 2. Published by Clapp & Poliak, 341 Madison Ave., New York 17, N.Y. Paper bound, mimeographed. 8½ x 11. 278 pages. $2.00.

Proceedings of the first Plant Maintenance Conference held in conjunction with the Plant Maintenance Show in Cleveland, Ohio, in January, are presented in these two volumes.

The comprehensive discussion of problems of plant maintenance covers maintenance organization and principles; maintenance costs and budgeting; selection and upkeep of lighting equipment; upkeep of motors, controls and distribution equipment; use of electrical instruments in maintenance; upkeep of floors, walls and roofs, relationship of lighting and color to production; sanitation and housekeeping; lubrication; application of service equipment; protection of plant and worker, and the importance of maintenance to safety.

Part 2 of the two-volume text contains 554 questions submitted by the conference audience, and the answers given by the conference leaders.

Part 1 includes 47 pages of tables, diagrams, illustrations, graphs and charts, together with the text of prepared papers and addresses.

"HEAT INERTIA" IN PROBLEMS OF AUTOMATIC CONTROL OF TEMPERATURE. By Victor Broida. Published by Instruments Publishing Co., 921 Ridge Ave., Pittsburgh 12, Pa. Paper bound. 62 pages. $1.00.

Solving process-control problems involving furnaces, stills, and even buildings by a new graphical method using logarithmic paper, can be mastered by anyone who has taken first-year differential equations. The author bases the method on his useful concept of the "fictitious mass" of a heat-process unit under automatic control, and although the book is not claimed to give an absolute and final solution, it does suggest a scientific method of research.

In the calculations provided (which, while starting on an entirely fictitious basis, lead to conclusions confirmed by automatic-control practice) the fictitious mass of a heating unit is expressed in kilograms or liters of water.

MANUAL OF ELECTRIC INSTRUMENTS. Compiled and published by General Electric Co., Schenectady, N.Y. 8½ x 11½. 150 pages. $1.00.

This profusely illustrated volume, prepared for classroom or office use, describes in simple language the fundamental construction and operation of all major types of electrical instruments. One chapter is devoted to each of thirteen basic types of instruments such as rectifiers, electrodynameters, synchroscopes and frequency meters.

Basic terminology necessary to the use of this book is presented in an extensive glossary and terms are indexed. Diagrams and photographs are clearly labeled.

Booklets and Pamphlets

NEWSPRINT SUPPLY: THREE QUESTIONS AND ANSWERS WITH ADDITIONAL INFORMATION. Published by Newsprint Association of Canada, Sun Life Building, Montreal, Canada. 21 pages. This booklet reprints an exchange of correspondence between Franklin D. Schurz, chairman of the Newsprint Committee of the Inland Daily Press Association, Chicago, and R. M. Fowler, president of the Newsprint Association of Canada, in which Mr. Schurz requested Mr. Fowler for "answers to three questions regarding supply of Canadian newsprint for U.S. consumers and 'any other information you can give us.'" The major part of the booklet is composed of Mr. Fowler's answers to the questions.

TOWARD NEW AND BETTER PRODUCTS FROM WOOD CELLULOSE. International Paper Co., 220 E. 42nd St., New York 17, N.Y. 8½ x 11. 18 pages. Free. A pictorial presentation of International's laboratories and pilot plants at Hawkesbury, Ontario, renowned for its research into the production and use of dissolving pulps for synthetic textiles.

TECHNICAL BULLETINS. Published by National Council for Stream Improvement, 271 Madison Ave., New York 16, N.Y. Bulletin 32, entitled "Kraft Mill Waste Report—The Causes and Reduction of Tastes and Odors in Kraft Mill Wastes," and bulletin 33, entitled "Kraft Mill Waste Report—The Use of *p*H as an Indicator of the Pollutional Potential of Kraft Pulp Mill Wastes," were

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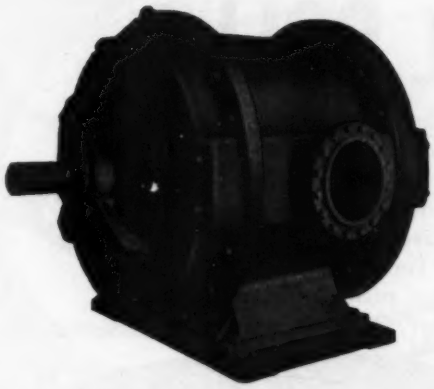

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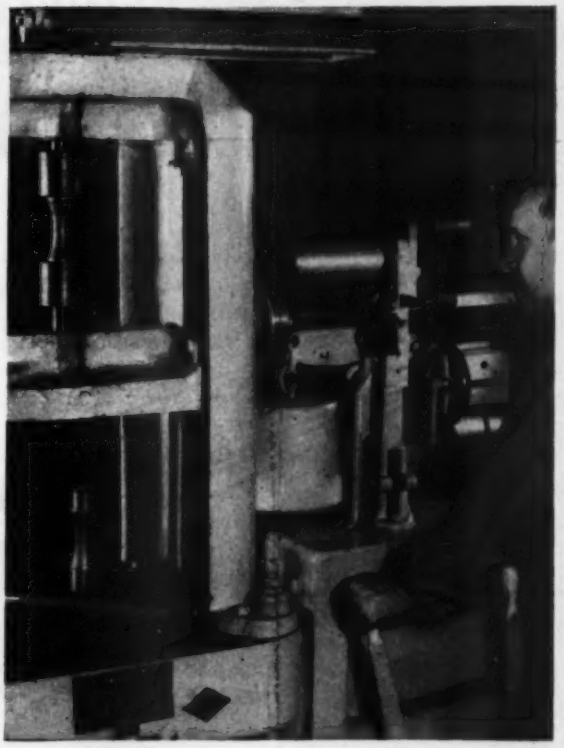

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published in March, 1950; bulletin 34, entitled "Factors Affecting the Reuse of Board Mill White Waters and Clarifier Underflows," was published in April, 1950.

THIS IS DU PONT—THE STORY OF CELLOPHANE. Published by E. I. du Pont de Nemours and Co., Inc., Wilmington 98, Del. 24 pages. This profusely illustrated booklet relates the history of cellophane, and in an easy and informal style describes the production of the material and its effect upon marketing and business. By showing many unusual uses for cellophane, du Pont suggests future possible uses for the material which may be profitable to business.

WELFARE PLANS AND COLLECTIVE BARGAINING. By John W. Whittlesey. Available from Chamber of Commerce of the United States, Washington 25, D.C. 44 pages. Deals with the subject of pension and welfare plans confronting industry today, and acquaints the employer with the over-all aspects of this problem and all the factors that will enter into his decision with regard to current union requests.

REDUCTION AND UTILIZATION OF WOOD WASTE. Prepared by the Waste Committee of the Technical Section, Canadian Pulp & Paper Association, 3420 University St., Montreal 2, Canada. Paper Bound. 8½ x 11. $2.00. Divided into three sections: 1. Utilization of Tree Tops; 2. Utilization of Sawmill Waste, Slabs, Shavings, Sawdust; and, 3. Economic Utilization of Forest Culls.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Vertical Speed Reducers. The Cleveland Worm & Gear Co., 3249-59 E. 80th St., Cleveland 4, Ohio—8-page Bulletin No. 125 describes and illustrates two vertical speed reducers which are suited to such equipment as agitators and mixers. Dimensional data, cross-section drawings, and thrust and overhung load capacity charts are included.

Refiners. Sprout-Waldron & Co., Inc., Muncy, Pa.—4-page Bulletin entitled "Better Fibers" contains Report No. 1 on Semichemical Pulping. This is the first issue of a new publication which will be sent out periodically by this company in the interest of pulp refining and stock preparation.

Combination Oil Cup and Gauge. Trico Fuse Mfg. Co., Milwaukee 12, Wis.—2-page Bulletin No. 31 describes and illustrates the combination visible oil cup and oil gauge. Dimensions in inches and list prices are given.

Lens Cleaning Stations. The Wilkins Co., Inc., Cortland 7, N. Y.—4-page folder describes and illustrates the K-Lens-M dispenser cabinets which aid in promoting better care of goggles and face shields. Illustrated.

Speed Reducers. Dodge Mfg. Corp., Mishawaka, Ind.—16-page Bulletin No. A-470 presents a complete story of the Dodge Torque-Arm speed reducer augmented by full-size photographs of the entire mechanism and simplified selection tables.

Controlling, Recording and Telemetering Instruments. The Bristol Co., Waterbury 91, Conn.—3-way folder briefly describes latest developments in automatic controlling, recording, and telemetering equipment, displayed at the Fourth National Instrument Exhibit. A photograph of the instruments on exhibit, arranged to show a typical installation, is included.

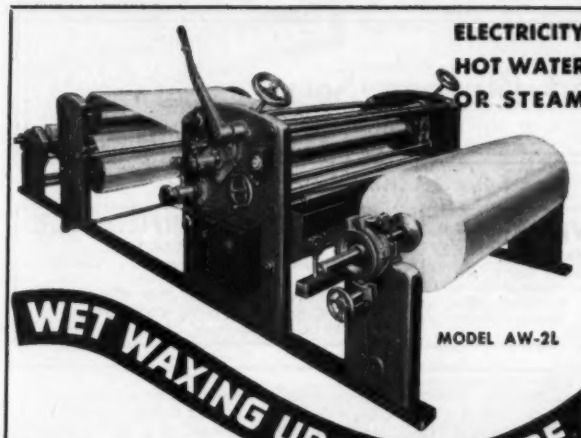
Resin Cement. Maurice A. Knight Co., Kelly Ave., Akron 9, Ohio—4-page Bulletin No. 4 describes Permanite cement, an acid proof mortar for acid-proof brick and tile installations. Typical uses, application instructions, and physical properties are given.

Storage Batteries. Gould Storage Battery Corp., Trenton, N.J.—40-page, revised Second Edition, pocket-size handbook contains technical instructions and engineering data on the care of motive-power storage batteries. Included are illustrations, line drawings, tables and charts. A 4-page section on the theory of the lead-acid battery has been added.

Air Lubricating Control Assembly. Airlube, Inc., 332 S. Michigan Ave., Chicago 4, Ill.—4-page pamphlet illustrates with photographs, and briefly describes the Pur-O-Luber and Pur-O-Fier, which provides a method of cleaning, controlling and lubricating compressed air lines.

Pulp Density Scale Tables. Denver Equipment Co., Dept. 169, Denver 17, Colo.—2 bulletins. Bulletin S-1-C-B covers pulps ranging from 5% solids at specific gravity 1.40 through pulps of 68% solids at specific gravity 3.20; Bulletin No. S-1-C-B1 covers low-range specific gravity pulps from 5% solids at specific gravity 1.35 through pulps of 68% solids at specific gravity 1.85. Pulp density formulas and charts are included.

Mechanical Tubing. The Babcock & Wilcox Tube Co., Beaver Falls, Pa.—Bulletin TB-324 describes ways in which increased production, lower manufacturing costs and short cuts to improved design may be reached by taking advantage of an unusual service em-



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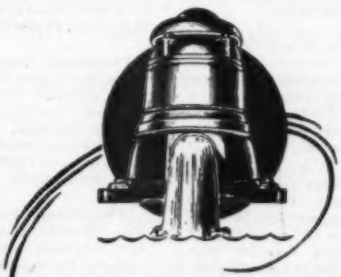

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Cast Iron Pulleys. Sprout-Waldron & Co., Muncy, Pa.—2 bulletins. 16-page Bulletin No. 33 carries latest revised prices on the complete line of Blue Face pulleys. Bulletin 35 lists prices and illustrates the S-W "Belt-Saver" pulley. Typical installation pictures shown.

Couplings. Falk Corp., 3001 W. Canal St., Milwaukee 8, Wis.—2 bulletins. Bulletin No. 8100 describes and illustrates Airflex couplings for frequent high torque load fluctuations. Installation photographs shown. Engineering Bulletin No. 8105 gives construction features, method of selection, (for engine driven systems, and for systems involving shock), and dimensions. Illustrated.

Wired Television. Diamond Power Specialty Corp., Lancaster, Ohio—16-page Bulletin No. 1025 describes and illustrates the Utiliscope which provides continuous observation of objects, operations or conditions in industry, research, commerce, science, education, etc. Application sketches are shown.

Hot Process Water Softeners. Graver Water Conditioning Co., 216 West 14th St., New York 11, N. Y.—36-page Bulletin No. WC-102 describes two basic designs and operation of Graver hot process softeners, together with six adaptations of each design to various plant conditions. More than 30 diagrams of hot process designs and flow charts, plus many photographs of installations of various sizes and types of units are included.

Air Conditioning. Niagara Blower Co., 405 Lexington Ave., New York, N. Y.—"Engineering Data on the Niagara Controlled Humidity Method" of air conditioning provides a new method of determining the load conditions and selection of equipment which simplifies the calculations. Included are detailed forms for the data and calculations, and curves from which factors are obtained, together with numerous flow diagrams. Price of this publication is $2.50.

Synchronous Motor. General Electric Co., Schenectady 5, N.Y.—8-page two-color Bulletin GEA-5332 illustrates typical installations of high-power-factor, constant-speed drives, describes their construction features and indicates mechanical modifications and performance data.

Program Controls. Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.—2-page Bulletin No. CH-1 describes and illustrates automatic time-temperature program controllers. Included are schematic drawing of a typical time-temperature program, listing of models, time cycle ranges, and prices.

Research and Engineering Service. Arthur D. Little, Inc., 30 Memorial Drive, Cambridge 42, Mass.—4-page folder entitled "Facts For Business Policy" describes the services offered by this company.

Centrifugal Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.—6-page, three-way Bulletin No. 382 describes and pictures the multistage centrifugal pumps for boiler feed and high pressure service. A large scale sectional picture shows operating features.

Paracoil Converters. Davis Engineering Corp., 1064 E. Grand St., Elizabeth 4, N. J.—12-page Bulletin 70-Section "K" describes and gives dimensional data and capacity ratings of 88 standard sizes of paracoil converters. Pressure drop for each unit is provided. Also included are installation diagrams, material specifications, data for determining steam requirement and pipe sizes, etc.

Demineralizers. Barstead Still & Sterilizer Co., Inc., 2 Lanesville Terrace, Forest Hills, Boston 31, Mass.—20-page Catalogue No. 123 describes in detail the difference between distilled and demineralized water. Case histories on quality control of water are cited. How ion-exchange purification works is shown. More than 30 illustrations are included.

Pneumatic Positioning Devices. Conoflow Corp., 2100 Arch St., Philadelphia 3, P. A.—8-page Bulletin No. 104 covers the field of pneumatic positioning devices for throttling control service. Design, application, and fundamental principles of operation and features of construction are included. Illustrated with photographs.

Flow Meters. Fischer & Porter Co., Hatboro, Pa.—12-page Catalogue No. 37 illustrates and describes the mercury manometer flow meters, for measuring flow rate of liquids, vapors and gases in piping systems. Includes diagrammatic sketches, photographs, engineering and specification data, and dimensions.

Non-Electric Magnets. Sprout-Waldron & Co., Muncy, Pa.—4-page Bulletin No. 11 illustrates and briefly describes some of the processing equipment on which a permanent non-electric magnet is used. Additional Data Bulletin No. 13 gives installation instructions and drawings.

Chlorine and Caustic Production. Chemical Plants Div., Blaw-Knox Construction Co., 321 Penn Ave., Pittsburgh 22, Pa.—28-page Bulletin No. 2261 describes the Mathieson mercury cell process for the manufacture of chlorine, caustic soda, and caustic potash. Cutaway view, flow diagrams, schematic diagrams, and photographs are included.

Manufacturer's Background. Reliance Electric & Engineering Co., 1082 Ivanhoe Rd., Cleveland 10, Ohio—18-page informative booklet entitled "Your Visit With Reliance" gives as complete a picture as possible of this company's facilities, operations, and products. Illustrated.

Battery-Electric Industrial Trucks. The Electric Industrial Truck Ass'n., 3701 N. Broad St., Philadelphia 40, Pa.—16-page booklet contains a number of articles describing the manner in which battery-electric industrial trucks are used by some 11 different mills and plants. Pictures of trucks of different types at work are included.

Vibration Control. The Korfund Co., Inc., 48-15 32nd Pl., Long Island City 1, N. Y.—4-page Bulletin No. G-102 contains characteristics of the various types of vibration isolation media. Typical machine and equipment applications are tabulated with recommendations for proper types of vibro-isolators. Descriptions of standard mountings, and specific purpose isolators are given.

Swivel Couplings. Gil-Lair Products, Inc., 81 Masonic Ct., Pasadena, Calif.—Catalogue No. 50 describes design features, gives complete specifications, working pressures and prices of this company's line of high-pressure and low-pressure All-Flex ball bearing swivel pipe couplings. Also described and illustrated are other products such as steel rotary hose, steel cementing hose, mud mixing guns, etc.

Elevators and Cranes. Barrett-Cravans Co., 4609 S. Western Blvd., Chicago 9, Ill.—36-page Bulletin No. 4951 presents the entire line of Barrett elevators. Portable cranes are also shown. Characteristics of elevators are illustrated, including their safety features. Specifications are included.

Compressors. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.—18-page Bulletin 3150 describes and illustrates with photographs the new line of packaged-type, heavy-duty electric-driven compressors for factories, mines, powerhouses, and large construction jobs. Cross sectional views show features of design. Cycle ratings and data included.

Report on Small Plant Feeding. Field Research Div., Paper Cup and Container Institute, Inc., 551 Fifth Ave., New York 17, N. Y.—19-page mimeographed report entitled "A Survey of Small Plant Feeding" is a study of 26 plants, having less than 1000 employees currently providing some type of in-plant feeding, in which the operations of food service systems are covered. Last three pages are data sheets of the complete study.

Flow Meters. Fischer & Porter Co., Hatboro, Pa.—12-page Catalogue No. 83 describes and illustrates the Ratosleeve meters suitable for plant-wide flow measurement of liquids, gases, pulps and slurries. Several sketches of installation orientations are shown, and dimensional drawings are included.

Research Requirements. Evans Research Development Corp., 250 E. 43rd St., New York 17, N. Y.—4-page report entitled "Third Annual Report On the Research Requirements of American Industry" is a survey of the aircraft, chemical, drug, cosmetic, food, beverage, paper, petroleum, and miscellaneous industries. Graphs illustrate trends for industry as a whole.

Laboratory Microscopes. Bausch & Lomb Optical Co., Rochester 2, N. Y.—24-page Catalogue No. D-185 describes and illustrates this company's line of laboratory microscopes. Specifications and price list are included.

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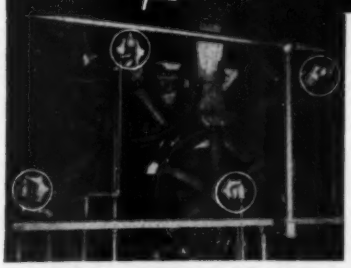

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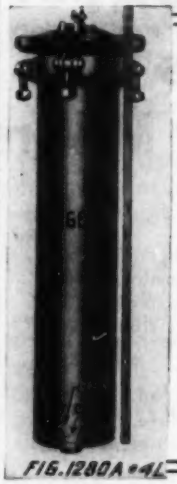

- More filtering area
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- Choice of full flow or by pass filtering
- Choice of inexpensive recharges
- Simple piping
- Capacities to meet every need

FIG. 1280A • 4L

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MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Blue Overalls	3.00 to 3.50
Corduroy, Men's	4.00 to 4.25
Corduroy, Ladies'	4.00 to 4.25
Washables, No. 1	3.75 to 4.00
Percales	6.75 to 7.00
Light Prints, No. 1	6.50 to 6.75
Khaki Cuttings—	
Bleachable	4.75 to 5.00
Unbleachable	4.25 to 4.50
New White Canvas	12.00 to 12.50
Canton Flannels, Bleached	11.50 to 11.75
Canton Flannels, unbleached	11.25 to 11.50
Shirt Cuttings—	
New White No. 1	12.00 to 12.25
White Shrunk	11.00 to 11.25
Silesias No. 1	8.25 to 8.50
New Unbleached	12.00 to 12.25
Fancy	5.75 to 6.00
Linen Cuttings—	
American	8.50 to 8.75
White	14.50 to 15.50
Grey	14.00 to 15.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.35 to 1.45
No. 2	1.25 to 1.35
No. 3 and 4	1.05 to 1.15
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	4.25 to 4.50
Miscellaneous	3.00 to 3.25
White, No. 2—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.25 to 5.50
Domestic	5.75 to 6.00
Wool Tares—	
Light	5.50 to 5.75
Heavy	6.00 to 6.25
No. 1 Scrap Bagging	4.75 to 5.00
Manila Rope—	
No. 1 large	5.50 to 5.75
No. 1 small	4.50 to 4.75
Sisal Rope—	
No. 1 large	5.00 to 5.25
No. 1 small	4.50 to 4.75
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	4.50 to 4.75
No. 2 sisal	4.00 to 4.25
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	110.00 to 120.00
Hard White, No. 1	90.00 to 100.00
Soft White No. 1	70.00 to 75.00
Soft White, one-cut	95.00 to 100.00
Soft White, Misc.	60.00 to 65.00
Fly Leaf, No. 1	30.00 to 35.00
Fly Leaf, Woody No. 1	22.50 to 25.00
No. 2 Mixed Col. Woody	20.00 to 22.50
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	26.00 to 28.00
Mixed Books	13.00 to 14.00
Ledger Stock—	
No. 1 White	50.00 to 55.00
No. 1 Mixed (Colored)	35.00 to 40.00
Manilas—	
New Env. Cuttings	65.00 to 70.00
New Env. Cuts, One-Cut	—
Extra Manilas	35.00 to 40.00
Manila Tab Cards, Free of Ground Wood	75.00 to 80.00
Colored Manila Tab Cards	40.00 to 45.00
Kraft—	
New Envelope Cuttings	70.00 to 75.00
Tripled Sorted No. 1 100%	37.50 to 42.50
No. 1 Old Assorted	30.00 to 32.50
News—	
White Blank	55.00 to 60.00
Overissue	18.00 to 19.00
No. 1 Folded	13.00 to 14.00
Old Corrugated Containers	28.00 to 29.00
New Jute Corrugated Cuts	27.50 to 30.00
Mill Wrappers	15.00 to 16.00
Box Board Chips	12.00 to 13.00
No. 1 Mixed Paper	12.00 to 13.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	80.00—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.50 to 5.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	25.00 to 26.00
Argentine, lb.	25.50 to 26.50
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.80 to 3.05
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.29¼ to .29¾
Litharge, powd. bbl. lb.	.13⅝ to .14¼
Rosin (Gum)—	New York, per 100 lbs.
E	6.10—
F	6.70—
G	6.70—
WW	7.00—
Rosin (Wood), carlots, F.O.B. South	4.80—

MARKET QUOTATIONS

Salt Cake—	
Dom. bulk (wks) ton	22.00 to 24.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	25.00—
Soda Ash—	
Bulk (works), cwt.	1.10 to 1.25
Paper Bags, cwt.	1.35 to 1.50
Soda (Caustic)—	
Solid drums, cwt.	2.20 to 2.25
Ground and flake, drums, cwt.	2.60 to 2.65
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.35 to 1.45
40 deg. 35 gal. drums, (works), cwt.	1.05 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	4.37—
Pearl, barrels, cwt.	4.57—
Paper, (Sp.) bags, cwt.	4.57—
Powdered, barrels, cwt.	4.98—
Sulphur (Crude)	
(Mine) bulk, long ton	18.00—
Talc—	
Dom. 100 lb. bags (mine) ton	22.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig. bbls., lb.	.19½ to .21½
Calcium Pig. bbls., lb.	.19& to .21½
Zinc Sulphide, bbls., lb.	11.5¤ to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, with inland freight allowed, are:

Bleached sulphite, Swed.	128.00—
Bleached, sulphite, Finish.	126.00—
Bleached sulphite, dom.	122.00 to 125.00
Easy bleaching sulphite	—
Unbleached kraft, Finn.	—
Unbleached sulphite, Swed.	107.60—
Unbleached sulphite, Fin.	—
Unbleached sulphite, dom.	107.60—
Unbleached kraft, Swedish	96.50—
Unbleached kraft, northern	105.00—
Unbleached kraft, southern	95.00 to 97.50
Bleached sulphate, Swedish	136.00—
Bleached soda, domestic	130.00 to 132.00
Sulphite screenings, dom.	40.00 to 50.00
Sulphite screenings, dom.	40.00 to 50.00
Groundwood, domestic and Canadian	65.00 to 67.50

PAPER

f.o.b. New York City

Boards—	per ton
Binders	100.00—
Chip	70.00—
Chip, tube and can	75.00—
Chip, full blending	77.50—
Chip, sgl. mla. lined	77.50—
Coated, white patent .016	120.00—
.020 and heavier	110.00—
Kraft liner	100.00 to 105.00
Filled News	72.50—
Container	85.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	16.00—
B Grade E.F.	15.15—
A Grade S. C.	16.40—
B Grade S. C.	15.65—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	20.25—
No. 2 Glossy	19.75—
No. 3 Glossy	18.25—
No. 4 Glossy	—
No. 2 Offset	16.15—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	54.45—
100% Rag	47.05—
75% Rag	35.15—
50% Rag	29.40—
25% Rag	25.75—

Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	55.70—
100% Rag	48.30—
75% Rag	37.65—
50% Rag	30.70—
25% Rag	27.15—

Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 watermarked	17.70—
No. 2 watermarked	16.75—
No. 4 watermarked	15.75—

Sulphite Ledger—	per cwt.
No. 1 watermarked	19.00—
No. 2 watermarked	18.20—
No. 4 watermarked	17.05—

Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof— Bleached (25 lb. up)	—
Unbleached (25 lb up)	—

News—	per ton
Rolls, Standard Contract	100.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	110.00—

Tissues (Carlots)—	per ream
White No. 1	1.55—
White No. 2	1.20—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.37½—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'ssed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	6.95—
Toilet, Unbleached (M. shts.) per cs.	5.75—

Towels—	per case
Bleached	5.25—
Unbleached	4.50—

Wrappings (Kraft)—	per cwt.
Super-Standard	8.00 to 8.50
No. 1 Wrapping	7.25 to 7.50
Standard Wrapping	6.50 to 6.75
Standard Bag	6.25 to 6.50
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b mill)

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M.F. & M.G. Waxing, 30 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers— Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—
Manilas— Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—
Wrapp Mla. 35 lb. up— No. 1	8.75—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing) Grade B20 lb.	—
Grade A-22 lb.	—

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Cooking factors of time, temperature and chemicals adjustable to conform to variables in raw materials and accurately meet predetermined requirements.

The Reaction Chamber is made in units and the number of these can be varied according to the degree of treatment required.

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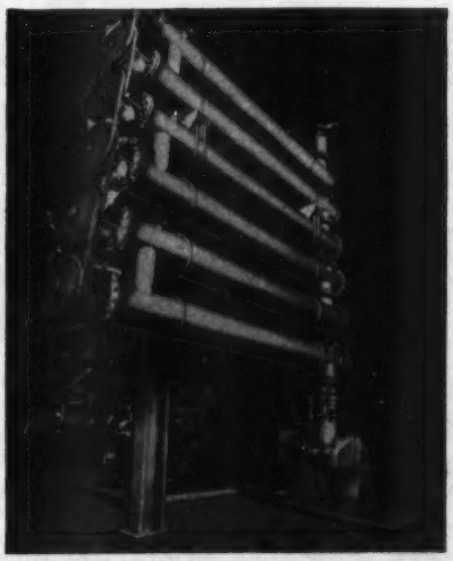

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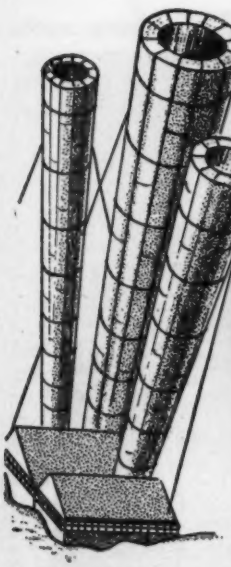

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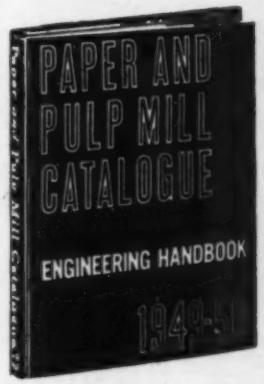

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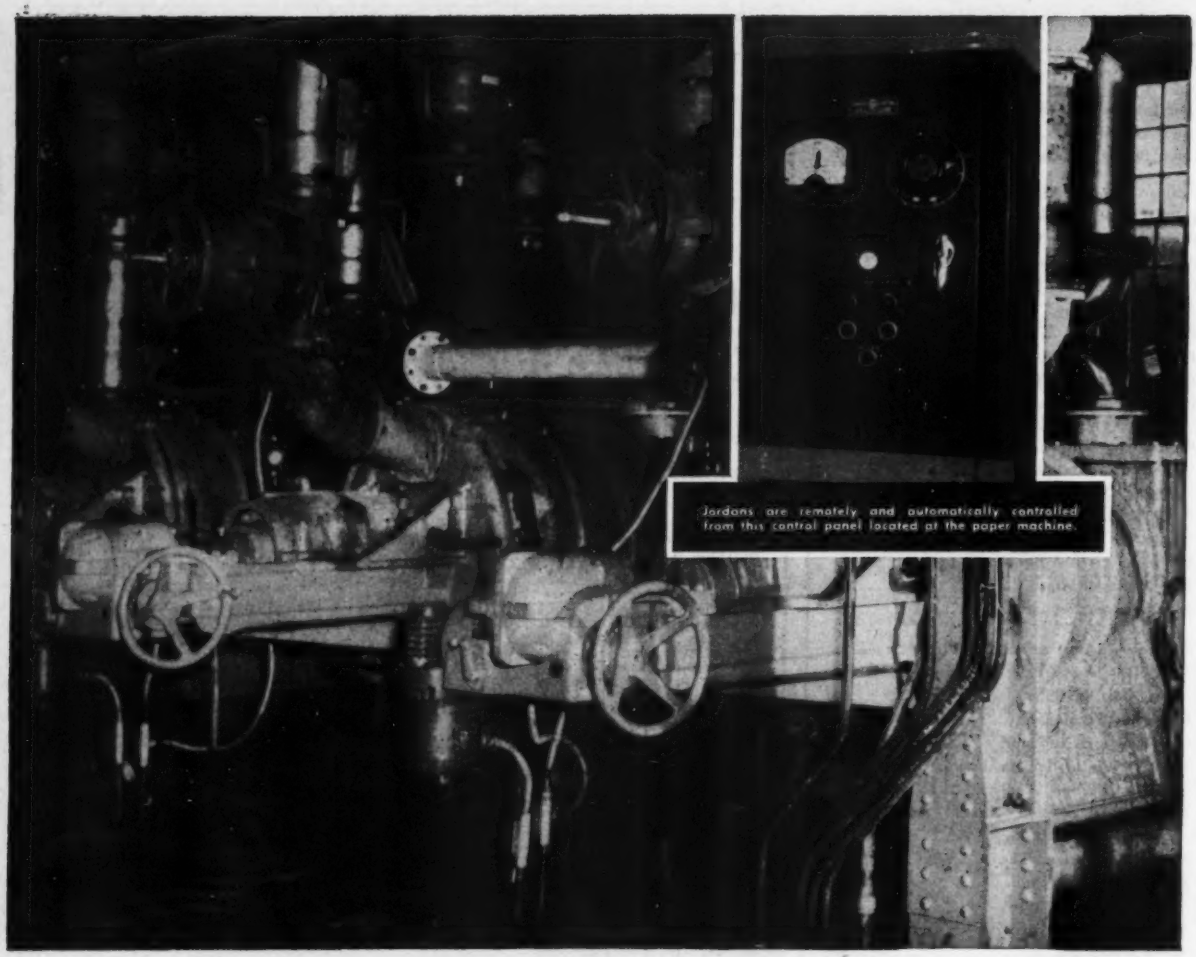

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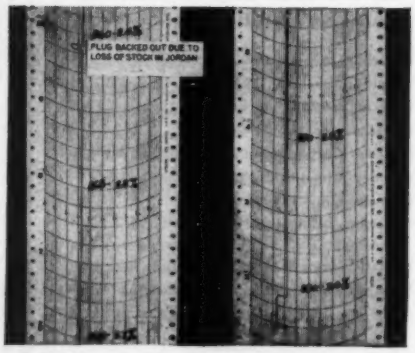

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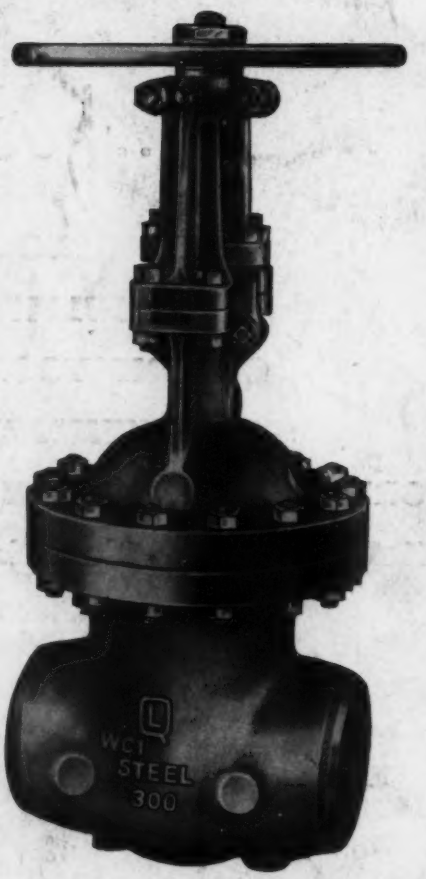

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